

# **Amchitka Island Environmental Analysis At Idaho National Laboratory**

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The INL is a U.S. Department of Energy National Laboratory  
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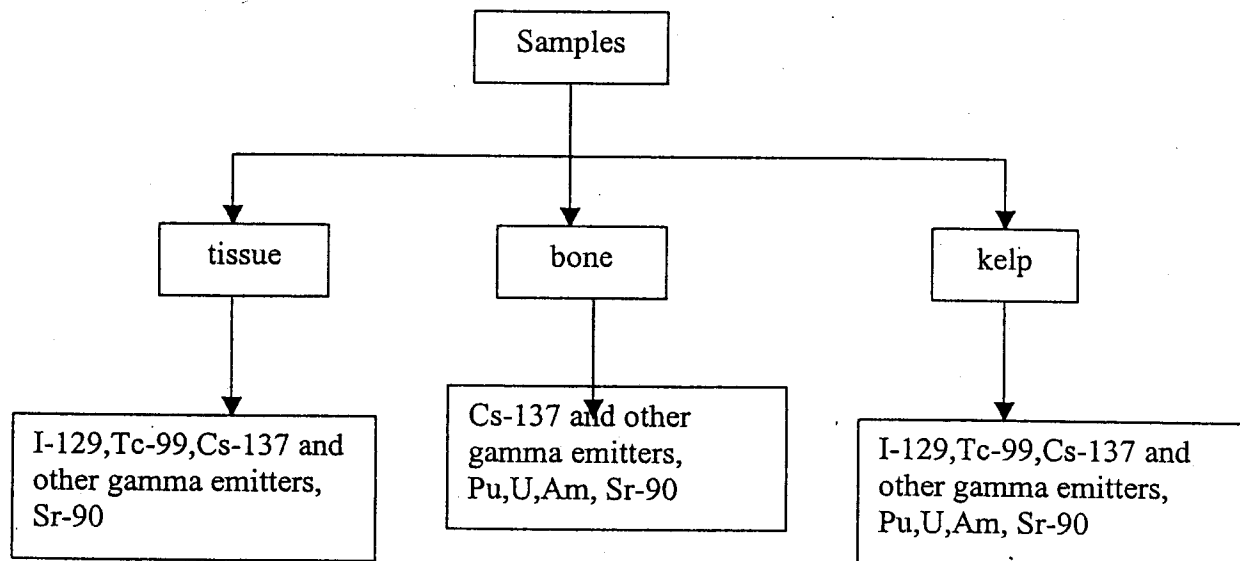
# Amchitka Island Environmental Analysis at Idaho National Laboratory

## EXECUTIVE SUMMARY

The Idaho National Laboratory (INL) provided support to Consortium for Risk Evaluation with Stakeholder Participation (CRESP) in their activities which is supported by the Department of Energy (DOE) to assess the impact of past nuclear testing at Amchitka Island on the ecosystem of the island and surrounding ocean. INL participated in this project in three phases, Phase 1, Phase 2 and Phase 3.

The roles of the INL in **phase 1 A** were to provide a method manual which explains the methods and measurement procedures to analyze alpha, beta, and gamma emitting radioisotopes in the environmental samples collected at Amchitka Island, a quality assurance plan that details how samples will be handled, data reporting requirements, calibrations, blank analysis, and setup of a performance demonstration program using blind samples.

In **Phase I B**, a common set of measurement methods and quality assurance plan were identified. In order to validate the methods identified with the identified sample matrices, INL did some method development work. Under this task, INL purchased samples similar to Amchitka samples from the local stores. These samples included fish (like salmon and halibut), crab, lobsters etc. The INL also purchased some kelp to test the methods. Samples were divided into three categories. (a) Flesh or tissue samples, (b) bone, and (c) kelp. All samples were ground to smaller pieces to make them homogeneous. The analytical scheme for each type of samples is shown in the following flowchart.



Sample size needed for each analysis to meet the customer detection limit with accuracy and precision in the analysis were tested in Phase 1. A trade off between detection limit, accuracy and precision was needed in terms of availability of the samples from the customer for some analysis. Gamma and  $^{129}\text{I}$  systems were calibrated with 100 g samples of each type with specific geometry. Test results in the method development phase, phase 1, were verified to choose the appropriate amounts of samples for radiochemistry (actinides- Pu, U, Am, and  $^{90}\text{Sr}$ ) and  $^{99}\text{Tc}$ . As a result, 100 g tissue samples for  $^{90}\text{Sr}$ , 15 g tissue and kelp samples for  $^{99}\text{Tc}$ , 12 g kelp samples for actinides and  $^{90}\text{Sr}$ , and 2 g bone samples for actinides and  $^{90}\text{Sr}$  analyses were identified. Gamma spectroscopy was used to measure  $^{137}\text{Cs}$ ,  $^{152}\text{Eu}$ , and  $^{60}\text{Co}$  or any additional isotopes detected. Low Energy Photon Spectrometer (LEPS) was used for  $^{129}\text{I}$  analysis. Samples underwent sample pretreatment, digestions and separations for actinides (Plutonium (Pu), Uranium (U), and Americium isotopes), Strontium-90 ( $^{90}\text{Sr}$ ), and Technetium-99 ( $^{99}\text{Tc}$ ), and alpha spectrometry, gas flow proportional counter, and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) measured the respective activities of the separated analytes. The Radiological and Environmental Sciences Laboratory (RESL) prepared simulated samples for the project. The developed and tested methods were applied to blind quality control samples from RESL for external quality control or performance audits purposes.

In Phase 2, the screening tests, six batches of samples were shipped from Rutgers University. INL analyzed samples shipped from Rutgers collected for the Amchitka project and QC samples were included in the sample batches. These samples comprised tissues and bones of different species of fish; tissues of other types of marine biota, tissues and bones of a few species of birds, and different species of kelps, analogous to the species identified in the Amchitka Science Plan<sup>1</sup>. INL used the validated methods modified and developed for this project in Phase I B, and analyzed the samples for the requested analyses and reported the results to the customer. INL also provided the completed quality assurance plan<sup>2</sup>, PLN-1719, Quality Assurance Project Plan for the Analysis of Amchitka Island Samples, a supplement to PLN-153<sup>3</sup>, Quality Assurance Project Plan for Analytical Laboratories Department Radioanalytical Activities.

In Phase 3, the customer sent three batches of samples including kelp and bone for actinide analyses using alpha spectrometry.

The details of sample results, QC results, and other related quality assurance documents are included in appropriate sections.



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# Amchitka Island Environmental Analysis at Idaho National Laboratory

## 1. INTRODUCTION

The Idaho National Laboratory (INL) operated by Battelle Energy Alliance (BEA) was tasked by Consortium for Risk Evaluation with Stakeholder Participation (CRESP) via CRESP/Department of Energy Idaho Operations Office (DOE-ID) interagency agreements to perform several radioisotope measurements to assess the impact of past nuclear testing at Amchitka Island on the ecosystem of the island and surrounding ocean.

At INL, the Science and Technology organization has the gamma, alpha, and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) capabilities available to measure the activity of these radioisotopes. The target list for INL consists of  $^{60}\text{Co}$ ,  $^{137}\text{Cs}$ ,  $^{152}\text{Eu}$ , or any other gamma emitting nuclides detected with gamma spectroscopy, I-129, Sr-90, Am-241, Pu-238, Pu239/240, U-234, U235, U236 and U238, and Tc-99. Gamma spectroscopy analyzes  $^{60}\text{Co}$ ,  $^{137}\text{Cs}$ ,  $^{152}\text{Eu}$ , or any other gamma emitting nuclides, low energy photon measurements with LEPS measures I-129, gas flow proportional counter measures the beta activity in Sr-90, alpha spectroscopy is used for counting actinides and ICP-MS is used for measuring Tc-99 activity.

INL provided a method manual<sup>4</sup>, which consists of procedures modified and developed for this project, and a quality assurance plan<sup>2</sup> to CRESP. The project was done in three phases, Phase 1, Phase 2, and Phase 3. In Phase 1, some new methods were developed, some existing methods were modified, and these methods were evaluated by simulated samples provided by an independent laboratory- Department of Energy Radiological and Environmental Sciences Laboratory (RESL). In Phase 2, and Phase 3, samples from Amchitka were analyzed for target radioisotopes using the different measurement systems following the procedures described in the manual. The data collected for these radioisotopes in different biological matrices (soft tissue, bone, and kelp) from Amchitka and the internal and external QC information are documented in this report.

## 2. EXPERIMENTAL

The procedures and documents utilized for the project are in the method manual<sup>4</sup>. For gamma and I-129 measurements, ACLP-10.10<sup>5</sup>, ACLP-10.31<sup>6</sup>, ACLP-10.41<sup>7</sup>, and ACMM 3606<sup>8</sup> were used. In radiochemistry, the analytes in samples were separated by complete ashing and dissolution of the samples using procedures ACMM-3815<sup>9</sup>, and ACMM-3816<sup>10</sup>. A new procedure, ACMM-3705<sup>11</sup>, developed for Tc-99, was used for Tc-99 analysis.

## 3. RESULTS AND DISCUSSION

There are three sections in this report. Details of the analyses, data package for the batches, quality assurance/quality control summary (Internal and External QA/QC

documentation) are found in each section. The data package for the batches is found in Appendix A (Appendix A-1: Gamma and I-129 analysis, Appendix A-2: Radiochemistry - Alpha and Strontium-90 analysis, and Appendix A-3: Tc-99 Analysis).

The results of the performance Evaluation (PE) standards and the blind QC samples evaluated for this project are in Appendix B. The internal and external quality control (QC) results are also included in this report. Documented in Appendix C (C-1 for gamma, and C-2 for radiochemistry) are the internal QC checks for the detectors used to count these samples. Results show that all relevant parameters were "in control" during the sample counting time frame. Results from the external QC intercomparison program are documented in Appendix D (D-1 for gamma, and D-2 for radiochemistry).

All QA/QC checks were performed in accordance with the QA plan<sup>2-3</sup> and the RML QA/QC Manual<sup>12</sup>. A copy of these documents is available from the RML Data Analysis Section upon request.

### 3.1. Gamma and I-129 Analysis

Five batches of samples were analyzed for gamma and three batches of samples were analyzed for I-129 from Phase 2. The standard geometry was defined as 125 ml polyethylene bottle. This geometry was used for both gamma and iodine measurement. A mixed National Institute of Standards and Technologies (NIST) traceable gamma emitting solution was purchased and prepared with homogeneous wet soft tissue, kelp, and bone. Two samples of each material were prepared, one full and one half full in the 125 ml containers of material and frozen. Efficiency curves were generated of each sample type. A similar procedure was followed for iodine except only soft tissue and kelp samples were prepared using a NIST traceable iodine standard. Efficiency curves were prepared for each sample type and geometry.

Performance Evaluation (PE) samples were obtained from RESL, and counted. The results are shown in Appendix B. Some of the activities of the PE samples were well below the minimum detection limit of the detector. Also, the detection of low energy photons of iodine can be interfered with from photons of the same energy from europium and cesium as well as many other isotopes. This effect results in large uncertainties in the quantitative results of some iodine measurements.

#### 3.1.1. COUNTING AND ANALYSIS INFORMATION

Included in this report are recount measurements identified by the addition of a "D" to the recounted sample ID. All samples plus the recount measurements were counted in standardized and calibrated geometry for eight hours. The detector counting systems employed were B4 for I-129 measurements and A4, A6 and D4 for regular gamma-ray measurement counting. A4, A6, and D4 are counting systems, which are designed so the detector axis is orthogonal (90°) with respect to the sample axis. Each sample measurement of the aforementioned counting systems were rotated on a turntable in front of the detector during counting duration to help negate the effects of potential inhomogeneity.

Sample spectra were analyzed by the PCGAP<sup>13</sup> computer program PCGAP/BATCH\_GNUL for *Windows* using the ENVLIB<sup>7</sup> decay data library for radionuclide identification with the required radionuclide list of the ENVLIM<sup>14</sup> library. The ENVLIM<sup>14</sup> library is a required gamma-ray energy library used to direct the photopeak fitting to the radionuclides of interest. The interference library utilized is ENVINTLIB<sup>14</sup>, which is used to correct for specific photopeak interferences that may occur. A common radionuclide target list from the Plan<sup>2</sup> for the Analysis of Amchitka Island Samples was utilized. This list contains 3 gamma-emitting radionuclides that are reported on the computer-generated gamma-ray analysis summary. The minimum detectable activity level (MDL) is listed for all results.

Instrumental background spectra were accumulated on the appropriate detector system. A weighted average of four instrumental background spectra for the detector was used in the analysis. Background ID numbers are listed in the sample information section of the Gamma-Ray Analysis Summary.

Data observed in this report are defensible for the samples as analyzed but do not reflect field-sampling uncertainties, representativeness, or survey completeness. Collaboration with RML personnel in data interpretation for end-use is encouraged.

### 3.1.2. SUMMARY OF TARGET RADIONUCLIDE RESULTS

The data report summary in the batches shows gamma-ray measured activities of 3 radionuclides, <sup>60</sup>Co, <sup>137</sup>Cs, <sup>152</sup>Eu, and low energy photon measurements for I-129.

The activities have been decay-corrected to the sample count time and date. The uncertainties shown on the summary pages are for the statistics associated with counting, backgrounds, and photopeak fitting, and estimated uncertainties in the detector efficiency and the sample geometry. Uncertainties are propagated in quadrature and are expressed as one estimated standard deviation.

The computer flags (+) results on the gamma analysis as true positive when the measured activity is greater than two times the measured standard deviation. The plus sign on the outside of the parenthesis around a result indicates the value as true positive where the measured radioactivity is a least two times the measured standard deviation. Either a plus (+) or a minus (-) value within the parenthesis indicates that the net counts in the spectral analysis were either positive or negative with respect to the photopeak fitting or instrument backgrounds. Flagged results determined by the analyst to be true positive and "real" are listed in Analyst's Results of Manmade Gamma-Emitting Radionuclides. The flagged results considered false positive is listed in Analyst's Results of Rejected Gamma-Emitting Radionuclides. Evaluation of these results was done in accordance with the criteria in RML procedure ACLP 10.31<sup>6</sup>.

Naturally occurring radionuclides with expected or normal concentrations are usually not reported on the Gamma-Ray Analysis Summary unless the concentrations are abnormally high.

### 3.1.3. ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

The results that were flagged (+) by the computer as true positive and satisfied the standard selection criteria of the RML or the analyst are reported on Analyst's Results of Manmade Gamma-Emitting Radionuclides summary. These true-positive and "real" results are reported as follows:

(1) Activity (S): The activity with the statistical uncertainty. This uncertainty includes the statistics associated with counting, backgrounds, and photopeak fitting.

(2) Activity (T): The activity with the total uncertainty. This uncertainty includes the statistical uncertainty, plus the estimated uncertainty in the sample geometry and the detector efficiency (Analyst's Results of Manmade Gamma-Emitting Radionuclides). These uncertainties have been propagated in quadrature and are expressed as one estimated standard deviation.

### 3.1.4. ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

The summary of the "Analyst's Results of Rejected Gamma-Emitting Radionuclides," lists the radionuclides that were determined to be false positive. These are the results flagged (+) by the computer as true-positive but did not satisfy standard selection criteria of the RML or the analyst(s). Rejection criteria codes are assigned to each false-positive radionuclide and a key code description is also listed.

### 3.1.5. RML GAMMA SPECTROSCOPY RESULTS AND QA/QC DATA

The gamma and I-129 results (data package) are in Appendix A-1. Included also in this report are the internal and external quality control (QC) results. Documented in Appendix C-1 are the internal QC checks for the detectors used to count these samples. Results show that all relevant parameters were "in control" during the sample counting time frame. Results from the external QC intercomparison program are documented in Appendix D-1.

## 3.2. Radiochemistry Alpha and Sr-90 analysis

During this project, there were six batches of samples for radiochemical analysis from Phase 2 and three batches of samples from Phase 3A. The samples were analyzed for Sr-90, Am-241, Pu-238, Pu239/240, U-234, U235, U236 and U238. Complete ashing and dissolution of the samples were achieved and no unusual steps were taken in performing the alpha analyses. The results in this report are the same results that were reported as preliminary results that were sent to CRESO during the period of January 2005 - June 2005. A list of samples with activities  $\geq 2$  sigma, with uncertainty @ one sigma, are also included with each batch's results.

The actinide procedure for small solid sample sizes in ACMM-3816<sup>10</sup> is used for alpha analysis. ACMM-3815<sup>9</sup> and ACMM 3816<sup>10</sup> were used for Strontium-90 analysis. For small biological samples, the strontium sulfate precipitation with 10% Li<sub>2</sub>SO<sub>4</sub> with pH adjustment is recommended twice to reduce calcium interference (Step 7.9.7 to 7.9.8). Batch 4 and Batch 5 had 15 g bone samples. These samples were considered as large samples. The large amount of calcium and other interference like phosphate in bone samples required several clean-up steps to separate strontium. In batch 4, B-L-150-B, B-L-151-B, both 15g, and B-M-140-B, which was 2.5 g, , produced relatively low yields of strontium because of the complexity of the samples. Batch 2 had some dense soft tissue samples (S-U-76, S-U-77, S-U-90, and S-U-96). These samples also had some interference, causing difficult strontium separation, and some of them had relatively low chemical yield. These soft tissue samples also caused some damage in the platinum dishes, that were used to process these samples. In batch 7, two kelp samples, K-AA-210-A, and K-AA-202-A, combusted in the drying process and part of these samples were lost. These samples also produced low actinide yields. The results for the external QC samples or PE samples from RESL from phase 1 and blind QC sample results from phase 2 and phase 3 are included in Appendix B.

Included in this report are results (data package) and the internal and external quality control (QC) results. Appendix A-2 shows the results of each batch. Documented in Appendix C-2 are the internal QC checks for the detectors used to count these samples. Results show that all relevant parameters were "in control" during the sample counting time frame. Results from the external QC intercomparison program are documented in Appendix D-2.

### 3.3. Technetium-99 (Tc-99) Analysis

A method to determine <sup>99</sup>Tc at environmental levels in plant tissues, animal tissues and related samples using inductively coupled plasma mass spectrometry (ICPMS) was developed and implemented for this program (ACMM-3705)<sup>11</sup>. The method is based upon several similar methods found in the literature<sup>15-19</sup>. Briefly, samples (5-25g) were weighed into preweighed crucibles. The samples were spiked with 100 µL of a 200 ng/mL Re solution used as a recovery standard (i.e. yield tracer). One sample in every batch (20 samples) was also spiked with 100 µL of a 377 dpm/mL solution of <sup>99</sup>Tc (i.e. 10 ng/mL). All samples were then treated with 10 mL of ammonia solution (~20%) in a fume hood to make the samples basic and stabilize the Tc and Re. The samples were then dried for at least 24 hr in an oven or on a hot plate at <75°C. The cooled, dried samples were reweighed to determine the dry weight and placed in a furnace at ~75°C and the temperature ramped to 550°C and held for 3 hrs. The ashed samples were removed from the furnace, cooled and reweighed to determine the ash content. The Tc and Re in the ashed samples was oxidized and "leached" from the ash using 10 mL of 8N HNO<sub>3</sub> and ~2 mL of H<sub>2</sub>O<sub>2</sub>. The "leach" solution containing the <sup>99</sup>Tc and Re was decanted from the ash, combined with at least two deionized water rinsates of the ash and diluted to >200 mL to dilute the HNO<sub>3</sub> in content to <0.5 N. To eliminate interferences and reconcentrate the analytes of interest, the diluted samples were run through 2 mL TEVA<sup>®</sup> cartridges or columns that had been preconditioned with 5 mL of 8 N HNO<sub>3</sub> to

assure that there was no residual analytes of interest on the column and then with 10 mL of 0.1N HNO<sub>3</sub> to readjust the column acidity to assure no loss of the analytes of interest. The columns with the trapped analytes were washed with 20 mL 1 N HNO<sub>3</sub> to assure removal of interferences (Ru in particular) and the analytes subsequently eluted into a clean beaker with 5 mL of 8 N HNO<sub>3</sub>. The volume of the eluted sample was evaporated to near dryness on a hot plate at <75°C, spiked with 100 µL of a 100 ng In/mL solution, and diluted to 10 mL with 0.1N HNO<sub>3</sub>. Samples were then analyzed with an inductively coupled plasma mass spectrometer (ICPMS) that had been standardized with series of standard solutions containing at most 15 dpm/mL <sup>99</sup>Re.

The most probable interferences in the mass spectrometric analysis of <sup>99</sup>Tc for are molybdenum hydride (<sup>98</sup>Mo<sup>1</sup>H) and Ruthenium (Ru) at m/z 99. The relative abundances for Ru at m/z 99 and m/z 101 are 12.6% and 17%, respectively. The Ru interference was corrected for by estimating the contribution of Ru at m/z 99 from the Ru response at m/z 101 and subtracting it from the m/z 99 response (i.e. Intensity at m/z 99 - 0.741 \* Intensity at m/z 101 = Intensity of <sup>99</sup>Tc). The actual correction factor for Ru was determined from a commercial Ru standard and determined to be 0.725. The probability of a significant interference by MoH is not likely the possible possibility of having this interference was determined by monitoring Mo at m/z 95 and/or Mo at m/z 98. No significant Mo was noted.

When natural abundance rhenium was used as the recovery standard, the Re concentration was simply determined at m/z 185. When a <sup>185</sup>Re enriched standard was used as the recovery standard, natural Re was subtracted by simply using an interelement correction for Re using <sup>187</sup>Re. The correction factor was determined to be 0.589 from natural abundance Re standards (i.e. Intensity at m/z 185 - 0.589 \* Intensity at m/z 187 = Intensity of <sup>185</sup>Re). Since tungsten hydrides (<sup>184</sup>W<sup>1</sup>H and <sup>186</sup>W<sup>1</sup>H) and <sup>187</sup>Os may interfere with the Re measurements, W at m/z 182 was monitored to assess the probability of a significant WH interference and an interelement correction for Os for <sup>187</sup>Re was made using the Os response at m/z 189 (i.e. Intensity at m/z 185 - 0.589 \* Intensity at m/z 187 = Intensity of <sup>185</sup>Re).

Final <sup>99</sup>Tc concentrations were determined by subtracting the mean blank value determined from multiple blank analyses during the course of the run for each sample set. The blank corrected concentrations were further corrected for the Re recovery. Errors were propagated for each calculation step. Additional errors were added to propagation of errors to accommodate the variability of the calibration checks during the run and the overall spiked sample recovery for all runs and batches. Detection limits were determined for each sample using the propagated error and a single-sided Student-t value at p=0.01 (i.e. is the concentration greater the range of values expected over a concentration of 0 at p=0.01). The Student-t value was selected at the appropriate degrees of freedom represented by the propagated error. The degrees of freedom for the propagated error was determined using Satterwaite's formula.

$$df = \frac{(\sum s_i^2)^2}{\sum \frac{s_i^2}{df_i}}$$

Table 3-1 represents the mean recovery of Tc of all of the spiked samples either submitted for analysis or spiked internal to the laboratory. Low recoveries on the initial performance evaluation samples and the laboratory spikes associated with the analysis of that batch are suspect to have been due to the availability of oxidation during the ashing step. While no quantitative information has been acquired in a controlled fashion, it was noted that allowing some air to enter the furnace always resulted in low <sup>99</sup>Tc recoveries while the Re recoveries were either not affected or only slightly diminished. Keeping the furnace closed tightly during the ashing step consistently resulted in higher <sup>99</sup>Tc recoveries. While no explanation exists for a 10% lower Tc recovery relative to Re in the literature<sup>20</sup>, oxygen availability during ashing could certainly be a contributing factor.

Actual data transmitted to CRESP for the four batches analyzed for <sup>99</sup>Tc are given in Appendix A-3.

Table 3-1 Mean Recovery of Tc-99

Spike Type	Tc-99 % Recovery	Standard Deviation	n	t at p=0.01, 2-sided	Expected Range		RSD
					Min	Max	
Lab Spikes							
Fish Flesh	91.5%	9.2%	12	3.11	62.9%	120.1%	10.1%
Kelp	96.3%	0.9%	5	4.60	92.3%	100.2%	0.9%
All	92.9%	8.0%	17	2.92	69.7%	116.2%	8.6%
Performance Evaluation							
Fish Flesh	86.1%	5.2%	3	9.92	34.3%	138.0%	6.1%
Kelp	90.3%	2.5%	3	9.92	65.3%	115.3%	2.8%
All	88.2%	4.3%	6	4.03	70.8%	105.6%	4.9%
Overall							
Fish Flesh	90.5%	8.7%	15	2.98	64.6%	116.3%	9.6%
Kelp	94.0%	3.4%	8	3.50	82.0%	106.1%	3.7%
All	91.7%	7.4%	23	2.82	70.8%	112.6%	8.1%

### 3.3.1. Case Narrative Batch 1 (soft tissue) - <sup>99</sup>Tc Analysis

- The spreadsheet file with the results from the first batch of Amchitka samples is found in Appendix A-3. Overall all, the analyses appeared to have gone rather smoothly. The following are items are notes and explanations from the analysis.



- The calibration  $^{99}\text{Tc}$  standards were prepared from the 20.2 ng/mL stock that has been in the laboratory and originated from Isotope Product Laboratories. Three calibration verification solutions were prepared from this standard or from a second standard from Isotope Product Laboratories (Source# 1052-73). Re in the calibration standards and three verification standards were from commercial stocks (VHG Lot# PREN32/02 or QCD Analysts lot# 040875WBS6114Q). Calibration verification standards were run a total of 10 times during the course of the analysis with  $^{99}\text{Tc}$  and Re being recovered at  $99.4 \pm 2.0\%$  and  $101.9 \pm 0.8\%$ , respectively. Yesterday, we received a  $^{99}\text{Tc}$  standard directly from NIST, which we will be using as a calibration verification standard for future analyses.
- One of the calibration verification standards also had 200 pg Ru/mL to check for the magnitude of effects on the interelement correction for  $^{99}\text{Tc}$ . Another simply had 200 pg Ru/mL. The net effect is that Ru at 200 pg/mL could create a negative bias of  $\sim 2$  pg/mL. No samples had more than  $\sim 1.5$  pg Ru/mL so any residual effects from Ru are an absolute minimum.
- Five calibration verification blanks were also run during the course of the analysis and the  $^{99}\text{Tc}$  was determined to be  $0.158 \pm 0.066$  pg/mL in these blanks. This value was subtracted from all sample results. Errors were propagated and the degrees-of-freedom of the propagated error determined using Satterwaite's formula.
- Additional errors from the Re correction and the precision of the calibration verification checks were also propagated and the final degrees of freedom determined with Satterwaite's formula. The propagated errors were multiplied by the 1-sided Student t value at  $p=0.01$  to estimate instrument detection limits for each sample.
- Samples of species types "G" and a couple of species type "L" had significant over recoveries of Re indicating the potential for the natural presence of Re in the samples. When Re recovery was over 100% no Re corrections were made. We finally received our  $^{185}\text{Re}$  standard and will be doing Re by isotope dilution in the future to eliminate these types of problems.
- Recoveries for species types "O" and "P" had consistently low Re recoveries indicating a possible matrix effect.
- The laboratory spiked blank recovered only 75.8%. This is slightly out of the range of 80-102% we have been seeing in the performance evaluation samples and in the laboratory spikes. In short, it appears that the procedure is more variable for flesh than for kelp. When evaluating the actual sample results one must keep in mind that the standard deviations presented only represent the deviations from the instrumental analysis and **do not** include any sample-to-sample or sample preparation variability. As we progress, an error representing sample-to-sample and sample preparation variability will be included into the propagation of errors. This should have little effect on the samples near and below the detection limit but will cause all samples with significant concentrations of  $^{99}\text{Tc}$  to have a **total error of  $\sim \pm 10\%$** . All positive samples in this batch (i.e. the spike and the blind spike) should be assumed to have a total error of  $\sim \pm 10\%$ . It also appears that there may be an average of a

~10% negative bias for  $^{99}\text{Tc}$ . This is not unexpected based upon the available literature for methods employing Re as a recovery standard.

### 3.3.2. Case Narrative Batch 2 (soft tissue) - $^{99}\text{Tc}$ Analysis

Following is the second set of Tc99 analyses. Notes are:

- We used  $^{185}\text{Re}$  as the recovery standard. To avoid the lengthy isotope dilution calculation then subtracting the intensity contributions and recalculating the  $^{185}\text{Re}$  concentration from the corrected intensity, we simply used an interelement correction calculating the  $^{185}\text{Re}$  natural intensity from the  $^{187}\text{Re}$  intensity. This subtracts all natural Re contributions from the  $^{185}\text{Re}$  peak as well as some  $^{185}\text{Re}$  in the enriched standards because the Re standard is only 93.6% enriched, i.e. in effect we are subtracting any enriched Re remaining in the standard from the enrichment process or about an additional 4% of the  $^{185}\text{Re}$  peak. It should be noted that in the few analyses we have done where we can measure the actual isotopic ratio on the standard and of a natural Re standard, the enrichment appears to be more like 94.38% $\pm$ 0.05% for the  $^{185}\text{Re}$ . In the natural Re standard, the  $^{185}\text{Re}$  was measured at 37.2% $\pm$ 0.2% in this run vs the expect 37.4%. Overall, this has no bearing on the analysis other than to demonstrate that the interelement correction is being performed as expected and that determining the natural Re from the  $^{187}\text{Re}$  residual in the enriched Re standard will be biased somewhat (i.e. 10-20%). A small error in the isotopic ratio of the enriched standard will have only a small effect on the determination of the natural Re. Indeed, the isotope dilution determination of the natural Re on a standard containing natural and enriched Re was ~95% while the determination by the standard calibration curve using the  $^{187}\text{Re}$  remaining in the enriched standard was ~114%. We will investigate this further to verify the actual enrichment so that the determination of the natural Re can be optimized. This is probably not that important, however, tissues and species that accumulate Re will probably also accumulate Tc.
- The liquid like samples (jellyfish?) and the bird eggs (mushy samples) had high natural Re concentrations. Having the  $^{185}\text{Re}$  enriched standard was a definite plus.
- Tc recovery in the laboratory spike was once again lower than expected at 71.4%.

### 3.3.3. Case Narrative Batch 3 (kelp and soft tissue) - $^{99}\text{Tc}$ Analysis

Following is the third set of Tc99 analyses. Notes are

- We used  $^{185}\text{Re}$  as the recovery standard. To avoid the lengthy isotope dilution calculation then subtracting the intensity contributions and recalculating the  $^{185}\text{Re}$  concentration from the corrected intensity, we simply used an interelement correction calculating the  $^{185}\text{Re}$  natural intensity from the  $^{187}\text{Re}$  intensity. This subtracts all natural Re contributions from the  $^{185}\text{Re}$  peak as well as some  $^{185}\text{Re}$  in the enriched standards because the Re standard is only 93.6% enriched, i.e. in effect we are

subtracting any "natural" Re remaining in the standard from the enrichment process or about an additional 4% of the  $^{185}\text{Re}$  peak. It should be noted that in the few analyses we have done where we can measure the actual isotopic ratio on the standard and of a natural Re standard, the enrichment of the  $^{185}\text{Re}$  standard appears to be more like  $94.45\% \pm 0.06\%$  this time vs the  $94.38\% \pm 0.05\%$  we determined in the last set of analyses. Since in the last set of samples we noted that the use of the remaining  $^{187}\text{Re}$  in the  $^{185}\text{Re}$  enriched standard to calculate the natural Re content led to an overestimation, this time, we corrected the  $^{187}\text{Re}$  and  $^{185}\text{Re}$  concentrations to the enrichment factor we have been measuring (i.e. the  $^{185}\text{Re}$  at 94.4% not 93.6% as stated by the supplier). This seems to have corrected the problems with using the  $^{187}\text{Re}$  for determining natural Re. Once again, this has no bearing on the Tc analysis and only serves to make the natural Re concentrations better. This is still probably not that important, however, tissues and species that accumulate Re will probably also accumulate Tc.

- Indeed, some of the samples in this batch, particularly, the kelp had very significant natural Re concentrations. In some cases, the natural Re was as much as 15x the  $^{185}\text{Re}$  added for tracking the procedure. Since we cannot be sure of the exact isotopic composition of the Re in these samples, there may be some added error in the Re determinations. In fact, for most of the very high Re containing samples, the spiked  $^{185}\text{Re}$  was over recovered slightly and no corrections were made to the Tc concentrations. We don't really have any good data at this time with regards to how the natural Re really affects the analysis due subtraction error or due to variations in the natural Re isotopic ratio. We have not investigated the possibility that geographical variations in the Re isotope ratio exist as they do for other elements. At this time we don't think this is causing a major problem. However, if it can be determined that this is a major problem, we may have to increase the  $^{185}\text{Re}$  spike level to attempt to swamp this effect out, provided there is no effect on column capacity, Tc recovery, etc.
- Tc recovery in the laboratory spikes for fish flesh and kelp were good at 92% and 95%, respectively. We are speculating that with more careful study we will find that the low recoveries for Tc can be tied to the quantity of available oxygen during the combustion/charring step.
- Since this batch had both kelp and fish, the overall relative standard deviation of all laboratory spiked samples of fish flesh and kelp has been added to the total uncertainty calculation (8.9).
- Note also that there was one sample with marginally detectable Tc at a very low concentration ( $1.5 \times 10^{-4} \pm 0.3 \times 10^{-4} \text{ Bq/g} = 0.0040 \pm 0.0007 \text{ pCi/g}$ ). This concentration is well below the required detection limits, only about 2x the estimated DL and in a sample that, interestingly enough, our lab technician speculates may be the blank control sample.

### 3.3.4. Case Narrative Batch 6 (soft tissue) - $^{99}\text{Tc}$ Analysis

Following is the fourth set of Tc99 analyses. Notes are

- There were only 8 samples, two of which appear to have been QA samples.
- We used  $^{185}\text{Re}$  as the recovery standard. To avoid the lengthy isotope dilution calculation then subtracting the intensity contributions and recalculating the  $^{185}\text{Re}$  concentration from the corrected intensity, we simply used an interelement correction calculating the  $^{185}\text{Re}$  natural intensity from the  $^{187}\text{Re}$  intensity. This subtracts all natural Re contributions from the  $^{185}\text{Re}$  peak as well as some  $^{185}\text{Re}$  in the enriched standards because the Re standard is only 93.6% enriched, i.e. in effect we are subtracting any enriched Re remaining in the standard from the enrichment process or about an additional 4% of the  $^{185}\text{Re}$  peak. It should be noted that in the few analyses we have done where we can measure the actual isotopic ratio on the standard and of a natural Re standard, the enrichment appears to be more like  $94.33\% \pm 0.02\%$  this time vs  $94.45\% \pm 0.06\%$  for set three and  $94.38\% \pm 0.05\%$  for set two. Since in the sample set two we noted that the use of the remaining  $^{187}\text{Re}$  in the  $^{185}\text{Re}$  enriched standard to calculate the natural Re content led to an overestimation, in sample sets three and four, we corrected the  $^{187}\text{Re}$  and  $^{185}\text{Re}$  concentrations to the enrichment factor we have been measuring (i.e. the  $^{185}\text{Re}$  at 94.4% not 93.6%). This seems to have corrected the problems with using the  $^{187}\text{Re}$  for determining natural Re. Once again, this has no bearing on the analysis other than to make the natural Re concentrations better. This is still probably not that important, however, tissues and species that accumulate Re will probably also accumulate Tc.
- Natural Re was as expected in the samples.
- Tc recovery in the laboratory spikes for fish flesh 93.0%. Since this batch had only flesh, the overall relative standard deviation of all spiked samples of fish flesh was added to the total uncertainty calculation (9.6%).

#### 4. REFERENCES

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- (3) PLN-153 "Quality Assurance Project Plan for Analytical Laboratories Department Radioanalytical Activities", Revision 2, May 2004.
- (4) INEEL Method Manual for the Amchitka Environmental Sample Analysis, Revision 1, December 2004.
- (5) ACLP-10.10 - TRA Radioanalytical Sample Management.
- (6) ACLP-10.31 - Evaluation and Verification of Data for Radionuclide Identification/Selection.
- (7) ACLP-10.41 - RML Germanium and Leps Detector Calibration.
- (8) ACMM 3606 - Gamma-Ray Analysis of Standardized Samples.
- (9) ACMM 3815 - Determination of Selected Actinides and Strontium-90 in Water.
- (10) ACMM 3816 - Determination of Selected Actinide Nuclides and Strontium-90 in Filters and Solids.
- (11) ACMM-3705- Determination of  $^{99}\text{Tc}$  in Biological Samples Using Teva<sup>®</sup> Resin.
- (12) Quality Assurance/Quality Control Program of the Radiation Measurements Laboratory for Gamma Spectroscopy and Direct Gross Alpha/Beta Counting. Reference # ST-CS-013-89, May 1989.
- (13) Radioanalytical Laboratory Group Hardware System and Software Program Application Configuration Management Plan #PLN-1536 Revision 0, January 2004.
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- (15) Mas, J. L.; Tagami, K.; Uchida, S. *Analytica Chimica Acta* **2004**, *509*, 83-88.
- (16) McCartney, M.; Rajendran, K.; Olive, V.; Busby, R. G.; McDonald, P.

*Journal of Analytical Atomic Spectrometry* 1999, 14, 1849-1852.

- (17) Tagami, K.; Uchida, S. *Journal of Radioanalytical and Nuclear Chemistry* 2003, 255, 547-551.
- (18) Tagami, K.; Uchida, S.; Hamilton, T.; Robison, W. *Applied Radiation and Isotopes* 2000, 53, 75-79.
- (19) Wakoff, B.; Nagy, K. L. *Environmental Science & Technology* 2004, 38, 1765-1771.
- (20) McCartney, M.; Olive, V.; Scott, E. M. *Journal of Radioanalytical and Nuclear Chemistry* 1999, 242, 413-418.



## **Appendix A-1**

### **Gamma and I-129 Analysis**



**BATCH 1**  
**GAMMA AND I-129**

021520056

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B

REPORT PERIOD  
111804 to 111804

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
19-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by

*Thom Sorensen*

Approved by

*El Jensen*

## SAMPLE INFORMATION

AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B)

FOR THE PERIOD  
111804 TO 111804

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
S-B-54 A	112404	A6112404015	85.000	A6110104026 A6101104014 A6090104021 A6080304030
S-B-55 A	112404	D4112404016	85.000	D4110104029 D4100404045 D4090104024 D4080304034
S-B-56 A	112404	A4112404019	85.000	A4110104025 A4100404039 A4090104020 A4080304029
S-B-66 A	112904	A6112904017	85.000	A6110104026 A6101104014 A6090104021 A6080304030
S-G-50 A	112304	A4112304022	85.000	A4110104025 A4100404039 A4090104020 A4080304029
S-G-51 A	112304	A6112304023	85.000	A6110104026 A6101104014 A6090104021 A6080304030
S-G-52 A	112304	D4112304024	85.000	D4110104029 D4100404045 D4090104024 D4080304034
S-G-53 A	112404	A4112404014	85.000	A4110104025 A4100404039 A4090104020 A4080304029
S-K-70 A	112904	D4112904023	85.000	D4110104029 D4100404045 D4090104024 D4080304034
S-K-75 A	113004	A6113004020	85.000	A6110104026 A6101104014 A6090104021 A6080304030
S-L-57 A	112404	A6112404020	70.000	A6110104026 A6101104014 A6090104021 A6080304030
S-L-58 A	112404	D4112404021	70.000	D4110104029 D4100404045 D4090104024 D4080304034
S-L-59 A	112904	A4112904016	70.000	A4110104025 A4100404039 A4090104020 A4080304029
S-L-72 A	113004	A6113004017	70.000	A6110104026 A6101104014 A6090104021 A6080304030
S-O-71 A	113004	A4113004016	85.000	A4110104025 A4100404039 A4090104020 A4080304029
S-O-73 A	113004	D4113004018	85.000	D4110104029 D4100404045

D4090104024 D4080304034

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
S-O-74 A	113004	A4113004019	85.000	A4110104025 A4100404039 A4090104020 A4080304029
S-P-67 A	112904	D4112904018	65.000	D4110104029 D4100404045 D4090104024 D4080304034
S-P-68 A	112904	A4112904021	65.000	A4110104025 A4100404039 A4090104020 A4080304029
S-P-68-A RECOUNT	122104	A6122104016	65.000	A6110104026 A6101104014 A6090104021 A6080304030
S-P-69 A	112904	A6112904022	65.000	A6110104026 A6101104014 A6090104021 A6080304030

## ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B)

REPORT PERIOD  
111804 TO 111804

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
S-K-75 A	A6113004020	CO 60	( 1.70 +/- 0.18)E-02	1.08E-02	5.0 5.0 0.0	( 1.7 +/- 0.2)E-02
S-K-75 A	A6113004020	CS 137	( 1.54 +/- 0.18)E-02	7.56E-03	5.0 5.0 0.0	( 1.5 +/- 0.2)E-02

Other gamma-emitting radionuclides determined to be true-postive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B)

MONITORING DATES  
111804 TO 111804

Analysis Rejection Code(s)  
(See the last page for the key.)

Radionuclide  
(gamma)

RML  
Sample ID

Customer  
ID

Requested gamma-emitting radionuclides determined to be false-positive.

None

Other gamma-emitting radionuclides determined to be false-positive.

None

## AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B)

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
111804 TO 111804

CUSTOMER ID	CO 60	MDL	CS 137	MDL	EU 152	MDL
S-B-54 A	(+4.39 +/- 12.)E-04	5.59E-03	(-4.70 +/- 15.)E-04	6.50E-03	(-3.36 +/- 2.9)E-03	1.23E-02
S-B-55 A	(-1.09 +/- 1.1)E-03	4.93E-03	(-9.68 +/- 14.)E-04	5.74E-03	(+2.55 +/- 3.4)E-03	1.42E-02
S-B-56 A	(-1.69 +/- 1.3)E-03	6.18E-03	(-7.41 +/- 16.)E-04	6.70E-03	(-2.03 +/- 2.3)E-03	1.02E-02
S-B-66 A	(-1.19 +/- 1.2)E-03	5.31E-03	(+2.46 +/- 1.6)E-03	6.78E-03	(-0.85 +/- 26.)E-04	1.09E-02
S-G-50 A	(-3.49 +/- 1.1)E-03	5.16E-03	(+7.31 +/- 15.)E-04	6.41E-03	(-6.43 +/- 26.)E-04	1.14E-02
S-G-51 A	(+1.58 +/- 1.3)E-03	5.86E-03	(-8.72 +/- 17.)E-04	7.22E-03	(-2.24 +/- 2.5)E-03	1.07E-02
S-G-52 A	(+7.69 +/- 11.)E-04	5.06E-03	(-2.96 +/- 13.)E-04	5.57E-03	(+3.36 +/- 2.5)E-03	1.07E-02
S-G-53 A	(-3.96 +/- 1.1)E-03	5.00E-03	(-1.75 +/- 1.8)E-03	7.59E-03	(-6.19 +/- 2.2)E-03	9.46E-03
S-K-70 A	(-5.30 +/- 11.)E-04	4.82E-03	(+1.10 +/- 1.4)E-03	5.88E-03	(+1.10 +/- 2.2)E-03	9.37E-03
S-K-75 A	(+1.70 +/- 18)E-02	1.08E-02	(+1.54 +/- 18)E-02	7.56E-03	(+2.17 +/- 2.6)E-03	1.12E-02
S-L-57 A	(-1.12 +/- 1.7)E-03	7.47E-03	(+3.40 +/- 20.)E-04	8.50E-03	(-1.16 +/- 3.4)E-03	1.42E-02
S-L-58 A	(+1.68 +/- 1.4)E-03	6.27E-03	(+4.61 +/- 17.)E-04	7.06E-03	(+1.33 +/- 3.3)E-03	1.40E-02
S-L-59 A	(-3.49 +/- 1.4)E-03	6.51E-03	(-1.01 +/- 2.0)E-03	8.68E-03	(-1.25 +/- 26.)E-04	1.15E-02
S-L-72 A	(-1.19 +/- 1.4)E-03	6.44E-03	(+6.17 +/- 14.)E-04	6.07E-03	(+1.20 +/- 3.5)E-03	1.50E-02
S-O-71 A	(-3.90 +/- 1.2)E-03	5.44E-03	(+1.25 +/- 1.7)E-03	7.22E-03	(-2.39 +/- 2.3)E-03	1.02E-02
S-O-73 A	(-4.53 +/- 10.)E-04	4.51E-03	(+1.11 +/- 16.)E-04	6.71E-03	(-8.58 +/- 31.)E-04	1.29E-02
S-O-74 A	(-2.84 +/- 1.1)E-03	5.05E-03	(-1.48 +/- 1.5)E-03	6.53E-03	(-2.08 +/- 2.3)E-03	1.00E-02
S-P-67 A	(+1.27 +/- 1.4)E-03	6.28E-03	(+1.53 +/- 1.3)E-03	5.43E-03	(+3.40 +/- 3.9)E-03	1.63E-02
S-P-68 A	(-4.37 +/- 1.3)E-03	6.24E-03	(+2.06 +/- 1.9)E-03	8.08E-03	(-3.62 +/- 2.9)E-03	1.26E-02
S-P-68-A RECOUNT	(+2.65 +/- 1.6)E-03	7.00E-03	(+2.84 +/- 2.1)E-03	8.76E-03	(-0.41 +/- 32.)E-04	1.36E-02
S-P-69 A	(-3.70 +/- 18.)E-04	7.86E-03	(-1.33 +/- 2.0)E-03	8.44E-03	(+7.55 +/- 32.)E-04	1.38E-02

NOTE: A plus sign before a parenthesis "+(" indicates the activity is greater than 2 standard deviations, i.e. true positive.



AMCHITKA/CRESP FISH SAMPLES (BATCH 1 BOTTLE A - SHIPMENT 7B

NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
111804 TO 111804

None

021520056

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

CRESP ANCHITKA I-129 BATCH 1

REPORT PERIOD  
113004 to 121004

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
19-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by



Approved by



## SAMPLE INFORMATION

CRESP AMCHITKA I-129 BATCH 1

FOR THE PERIOD  
113004 TO 121004

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID (s)
S-B-54-A	120204	B4120204406	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-B-55-A	120204	B4120204407	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-B-56-A	120304	B4120304408	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-B-66-A	120604	B4120604412	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-G-50-A	113004	B4113004402	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-G-51-A	113004	B4113004403	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-G-52-A	120104	B4120104404	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-G-53-A	120104	B4120104405	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-K-70-A	120804	B4120804416	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-K-75-A	121004	B4121004421	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-L-57-A	120304	B4120304409	70.000	B4121104012 B4110604006 B4100404043 B4090704018
S-L-58-A	120404	B4120404410	70.000	B4121104012 B4110604006 B4100404043 B4090704018
S-L-59-A	120404	B4120404411	70.000	B4121104012 B4110604006 B4100404043 B4090704018
S-L-72-A	120904	B4120904418	70.000	B4121104012 B4110604006 B4100404043 B4090704018
S-O-71-A	120804	B4120804417	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-O-73-A	120904	B4120904419	85.000	B4121104012 B4110604006

B4100404043 B4090704018

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	RECOUNT	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
S-O-73-A		122104	B4122104017	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-O-74-A		121004	B4121004420	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-P-67-A		120604	B4120604413	65.000	B4121104012 B4110604006 B4100404043 B4090704018
S-P-68-A		120704	B4120704414	65.000	B4121104012 B4110604006 B4100404043 B4090704018
S-P-69-A		120704	B4120704415	65.000	B4121104012 B4110604006 B4100404043 B4090704018

ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

CRESP AMCHITKA I-129 BATCH 1

REPORT PERIOD  
113004 TO 121004

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties & Geom. Eff. Other	Activity(T) (BQ/GM)
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Requested gamma-emitting radionuclides determined to be true-positive

None

Other gamma-emitting radionuclides determined to be true-postive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

CRESP AMCHITKA I-129 BATCH 1

MONITORING DATES  
113004 TO 121004

Customer ID	RML Sample ID	Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)
_____	_____	_____	_____

Requested gamma-emitting radionuclides determined to be false-positive.

None

Other gamma-emitting radionuclides determined to be false-positive.

None

## CRESP AMCHITKA I-129 BATCH 1

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
113004 TO 121004

CUSTOMER ID	I 129	MDL
S-B-54-A	(+7.34 +/- 15.)E-04	6.85E-03
S-B-55-A	(-2.37 +/- 1.5)E-03	6.70E-03
S-B-56-A	(+1.06 +/- 2.1)E-03	9.18E-03
S-B-66-A	(+1.83 +/- 1.7)E-03	7.34E-03
S-G-50-A	(-5.82 +/- 17.)E-04	7.45E-03
S-G-51-A	(+1.50 +/- 1.8)E-03	8.02E-03
S-G-52-A	(-4.48 +/- 17.)E-04	7.48E-03
S-G-53-A	(+1.76 +/- 1.6)E-03	7.27E-03
S-K-70-A	(+2.73 +/- 17.)E-04	7.62E-03
S-K-75-A	(+1.45 +/- 1.7)E-03	7.33E-03
S-L-57-A	(+3.27 +/- 2.1)E-03	9.08E-03
S-L-58-A	(-3.06 +/- 18.)E-04	7.94E-03
S-L-59-A	(+3.47 +/- 18.)E-04	7.96E-03
S-L-72-A	(-1.58 +/- 1.6)E-03	6.99E-03
S-O-71-A	(-2.23 +/- 14.)E-04	6.43E-03
S-O-73-A	(-2.34 +/- 1.3)E-03	6.06E-03
S-O-73-A RECOUNT	(-2.14 +/- 1.4)E-03	6.20E-03
S-O-74-A	(-7.29 +/- 13.)E-04	5.98E-03
S-P-67-A	(-0.63 +/- 21.)E-04	9.24E-03
S-P-68-A	(+1.43 +/- 1.8)E-03	8.07E-03
S-P-69-A	(+1.72 +/- 2.0)E-03	8.60E-03

NOTE: A plus sign before a parenthesis "+(" indicates the activity is greater than 2 standard deviations, i.e. true positive.



CRESP AMCHITKA I-129 BATCH 1

NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
113004 TO 121004

None

**BATCH 2**  
**GAMMA AND I-129**

021520056

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

AMCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2

REPORT PERIOD  
120804 to 122104

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
19-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by

*Don Sorenson*

Approved by

*Elfer*

SAMPLE INFORMATION  
 ANCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2  
 FOR THE PERIOD  
 120804 TO 122104

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
S-K-60-A	120904	D4120904015	85.000	D4120104020 D4110104029 D4100404045 D4090104024
S-K-61-A	120904	A4120904016	85.000	A4120104016 A4110104025 A4100404039 A4090104020
S-K-63-A	120904	A6120904017	85.000	A6120104017 A6110104026 A6101104014 A6090104021
S-K-88-A	120904	D4120904018	83.210	D4120104020 D4110104029 D4100404045 D4090104024
S-K-89-A	121004	A4121004024	85.680	A4120104016 A4110104025 A4100404039 A4090104020
S-M-80-A	120804	A4120804019	100.000	A4120104016 A4110104025 A4100404039 A4090104020
S-M-81-A	120804	A6120804020	100.000	A6120104017 A6110104026 A6101104014 A6090104021
S-M-82-A	120804	D4120804021	100.000	D4120104020 D4110104029 D4100404045 D4090104024
S-M-83-A	120804	A4120804022	100.000	A4120104016 A4110104025 A4100404039 A4090104020
S-M-84-A	120804	A6120804023	100.000	A6120104017 A6110104026 A6101104014 A6090104021
S-M-85-A	120804	D4120804024	100.000	D4120104020 D4110104029 D4100404045 D4090104024
S-M-86-A	120904	A4120904013	100.000	A4120104016 A4110104025 A4100404039 A4090104020
S-M-87-A	120904	A6120904014	100.000	A6120104017 A6110104026 A6101104014 A6090104021
S-M-87-A RECOUNT	122104	A4122104015	100.000	A4120104016 A4110104025 A4100404039 A4090104020
S-U-76-A	121004	A6121004025	85.000	A6120104017 A6110104026 A6101104014 A6090104021
S-U-77-A	121004	D4121004026	85.000	D4120104020 D4110104029

D4100404045 D4090104024

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
S-U-90-A	121004	A4121004030	85.000	A4120104016 A4110104025 A4100404039 A4090104020
S-U-96-A	121004	A6121004031	85.000	A6120104017 A6110104026 A6101104014 A6090104021
S-VN-102-A	121004	D4121004032	100.000	D4120104020 D4110104029 D4100404045 D4090104024
S-VN-103-A	121104	A4121104008	100.000	A4120104016 A4110104025 A4100404039 A4090104020
S-VN-104-A	121104	A6121104009	100.000	A6120104017 A6110104026 A6101104014 A6090104021

## ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

## AMCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2

REPORT PERIOD  
120804 TO 122104

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
S-K-89-A	A4121004024	CO 60	( 1.3 +/- 0.2)E-02	1.02E-02	5.0 5.0 0.0	( 1.3 +/- 0.2)E-02
S-K-89-A	A4121004024	CS 137	( 1.2 +/- 0.2)E-02	8.35E-03	5.0 5.0 0.0	( 1.2 +/- 0.2)E-02

Other gamma-emitting radionuclides determined to be true-postive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

AMCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2

MONITORING DATES  
120804 TO 122104

Analysis Rejection Code(s)  
(See the last page for the key.)

Radionuclide  
(gamma)

RML  
Sample ID

Customer  
ID

Requested gamma-emitting radionuclides determined to be false-positive.

S-VN-104-A

A6121104009

EU 152

1,2,4,6

Other gamma-emitting radionuclides determined to be false-positive.

None



Number	Rejection Code Key Definition
1	Uncertainty to high to be accepted by analyst
2	Radionuclide had no supporting photopeaks to make a judgement
3	Peak width unacceptable by the analyst
4	Radionuclide results below decision critical level
5	Other radionuclide gamma-ray interferences
6	Graphical display of analyzed photopeaks showed unacceptable fitting results
7	No parent activity, therefore the state of equilibrium is unknown and the radionuclide cannot be quantified
8	Naturally occurring radionuclide with expected activity
9	Other

## AMCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
120804 TO 122104

CUSTOMER ID	CO 60	MDL	CS 137	MDL	EU 152	MDL
S-K-60-A	(-1.15 +/- 1.2)E-03	5.50E-03	(-1.78 +/- 1.8)E-03	7.64E-03	(+3.33 +/- 3.1)E-03	1.30E-02
S-K-61-A	(-2.30 +/- 1.4)E-03	6.56E-03	(-6.87 +/- 22.)E-04	9.35E-03	(-1.46 +/- 2.9)E-03	1.29E-02
S-K-63-A	(-1.01 +/- 14.)E-04	6.16E-03	(+1.31 +/- 1.6)E-03	6.95E-03	(-5.30 +/- 24.)E-04	1.03E-02
S-K-88-A	(-5.52 +/- 12.)E-04	5.21E-03	(-6.17 +/- .82)E-03	3.60E-03	(-5.20 +/- 29.)E-04	1.20E-02
S-K-89-A	(+1.26 +/- .21)E-02	1.02E-02	(+1.18 +/- .20)E-02	8.35E-03	(-7.63 +/- 30.)E-04	1.28E-02
S-M-80-A	(-2.62 +/- 1.1)E-03	5.19E-03	(+3.15 +/- 1.7)E-03	7.40E-03	(-3.35 +/- 1.8)E-03	7.98E-03
S-M-81-A	(-1.57 +/- .94)E-03	4.26E-03	(+2.03 +/- 1.4)E-03	6.10E-03	(+1.62 +/- 24.)E-04	9.97E-03
S-M-82-A	(-2.55 +/- 9.7)E-04	4.27E-03	(+1.40 +/- 1.2)E-03	5.12E-03	(+0.85 +/- 25.)E-04	1.06E-02
S-M-83-A	(-1.16 +/- .99)E-03	4.63E-03	(+1.30 +/- 1.6)E-03	6.62E-03	(-3.00 +/- 20.)E-04	8.49E-03
S-M-84-A	(-7.73 +/- 11.)E-04	5.03E-03	(-0.02 +/- 16.)E-04	6.72E-03	(+0.65 +/- 26.)E-04	1.11E-02
S-M-85-A	(-7.56 +/- 9.8)E-04	4.37E-03	(-9.47 +/- 13.)E-04	5.56E-03	(-6.27 +/- 26.)E-04	1.11E-02
S-M-86-A	(-3.69 +/- .88)E-03	4.21E-03	(+7.46 +/- 13.)E-04	5.78E-03	(-1.99 +/- 1.9)E-03	8.12E-03
S-M-87-A	(-1.03 +/- .42)E-03	2.18E-03	(+4.82 +/- 14.)E-04	6.05E-03	(-1.22 +/- 25.)E-04	1.04E-02
S-M-87-A RECOUNT	(-2.32 +/- 1.0)E-03	4.66E-03	(+2.67 +/- 1.6)E-03	6.69E-03	(+2.79 +/- 19.)E-04	8.28E-03
S-U-76-A	(-6.19 +/- 11.)E-04	5.11E-03	(+3.15 +/- 17.)E-04	6.98E-03	(-2.24 +/- 30.)E-04	1.25E-02
S-U-77-A	(+5.71 +/- 12.)E-04	5.11E-03	(-8.05 +/- 19.)E-04	7.86E-03	(+1.91 +/- 2.4)E-03	1.02E-02
S-U-90-A	(-2.95 +/- 1.6)E-03	7.24E-03	(+6.52 +/- 21.)E-04	8.85E-03	(-2.66 +/- 3.5)E-03	1.52E-02
S-U-96-A	(+7.15 +/- 12.)E-04	5.45E-03	(+1.27 +/- 1.8)E-03	7.53E-03	(+1.05 +/- 2.7)E-03	1.15E-02
S-VN-102-A	(+2.62 +/- 11.)E-04	4.70E-03	(+1.32 +/- 15.)E-04	6.24E-03	(+1.18 +/- 2.5)E-03	1.03E-02
S-VN-103-A	(-2.61 +/- 1.5)E-03	6.68E-03	(+1.99 +/- 1.6)E-03	6.77E-03	(-9.99 +/- 27.)E-04	1.19E-02
S-VN-104-A	(-1.01 +/- 1.0)E-03	4.57E-03	(-0.90 +/- 13.)E-04	5.52E-03	(+6.62 +/- 2.3)E-03	1.03E-02

NOTE: A plus sign before a parenthesis "+(" indicates the activity is greater than 2 standard deviations, i.e. true positive.

AMCHITKA/CRESP SOFT TISSUE SAMPLES - BATCH 2  
NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
120804 TO 122104

None

021520056

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

Amchitka Island Environmental Analysis - Batch-2 I-129

REPORT PERIOD  
121104 to 123004

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
23-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by

*Don Soren*

Approved by

*Cliff Jensen*

## SAMPLE INFORMATION

Amchitka Island Environmental Analysis - Batch-2 I-129

FOR THE PERIOD  
121104 TO 123004

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
S-K-60-A	121604	B4121604431	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-K-61-A	121704	B4121704432	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-K-63-A	121704	B4121704433	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-K-88-A	121804	B4121804434	83.210	B4121104012 B4110604006 B4100404043 B4090704018
S-K-89-A	121804	B4121804435	85.680	B4121104012 B4110604006 B4100404043 B4090704018
S-M-80-A	121104	B4121104423	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-81-A	121304	B4121304424	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-82-A	121304	B4121304425	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-83-A	121404	B4121404426	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-84-A	121404	B4121404427	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-85-A	121504	B4121504428	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-86-A	121504	B4121504429	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-M-87-A	121604	B4121604430	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-U-76-A	122004	B4122004436	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-U-77-A	122004	B4122004437	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-U-90-A	122104	B4122104438	85.000	B4121104012 B4110604006

B4100404043 B4090704018

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
S-U-96-A	122204	B4122204439	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-U-96-A RECOUNT	123004	B4123004012	85.000	B4121104012 B4110604006 B4100404043 B4090704018
S-VN-102-A	122204	B4122204440	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-VN-103-A	122304	B4122304441	100.000	B4121104012 B4110604006 B4100404043 B4090704018
S-VN-104-A	122704	B4122704442	100.000	B4121104012 B4110604006 B4100404043 B4090704018

ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

Anchitka Island Environmental Analysis - Batch-2 I-129

REPORT PERIOD  
121104 TO 123004

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
None						

Other gamma-emitting radionuclides determined to be true-positive

None



ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

Amchitka Island Environmental Analysis - Batch-2 I-129

MONITORING DATES  
121104 TO 123004

Customer ID	RML Sample ID	Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)

Requested gamma-emitting radionuclides determined to be false-positive.

None

Other gamma-emitting radionuclides determined to be false-positive.

None

## Amchitka Island Environmental Analysis - Batch-2 I-129

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
121104 TO 123004

CUSTOMER ID	I 129	MDL
S-K-60-A	(-1.93 +/- 1.3)E-03	5.79E-03
S-K-61-A	(-1.21 +/- 1.5)E-03	6.52E-03
S-K-63-A	(-2.53 +/- 16.)E-04	7.23E-03
S-K-88-A	(+4.70 +/- 15.)E-04	6.81E-03
S-K-89-A	(-1.91 +/- 1.4)E-03	6.27E-03
S-M-80-A	(-2.33 +/- 1.3)E-03	5.84E-03
S-M-81-A	(-8.52 +/- 17.)E-04	7.63E-03
S-M-82-A	(+0.92 +/- 14.)E-04	6.38E-03
S-M-83-A	(-8.69 +/- 13.)E-04	5.99E-03
S-M-84-A	(+2.50 +/- 1.7)E-03	7.45E-03
S-M-85-A	(+2.27 +/- 1.5)E-03	6.70E-03
S-M-86-A	(+3.04 +/- 13.)E-04	5.85E-03
S-M-87-A	(-1.05 +/- 1.4)E-03	6.12E-03
S-U-76-A	(+1.92 +/- 15.)E-04	6.56E-03
S-U-77-A	(+3.58 +/- 16.)E-04	7.12E-03
S-U-90-A	(-2.83 +/- 15.)E-04	6.53E-03
S-U-96-A	(+1.74 +/- 1.5)E-03	6.81E-03
S-U-96-A RECOUNT	(-1.20 +/- 15.)E-04	6.61E-03
S-VN-102-A	(-1.86 +/- 1.4)E-03	6.44E-03
S-VN-103-A	(+5.26 +/- 15.)E-04	6.47E-03
S-VN-104-A	(+2.22 +/- 1.6)E-03	7.24E-03

NOTE: A plus sign before a parenthesis "+" indicates the activity is greater than 2 standard deviations, i.e. true positive.

Anchitka Island Environmental Analysis - Batch-2 I-129

NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
121104 TO 123004

None

**BATCH 3  
GAMMA AND I-129**

021520056



GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

Anchitka Island Environmental Analysis - Batch - 3 Gamma

REPORT PERIOD  
010305 to 011705

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
24-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by   
Approved by 

## SAMPLE INFORMATION

Amchitka Island Environmental Analysis - Batch - 3 Gamma

FOR THE PERIOD  
010305 TO 011705

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
K-AA-105-A	10305	A4010305022	100.000	A4010605014 A4120104016 A4110104025 A4100404039
K-AA-106-A	10305	A6010305023	100.000	A6010605015 A6120104017 A6110104026 A6101104014
K-AA-111-A	10405	A4010405011	100.000	A4010605014 A4120104016 A4110104025 A4100404039
K-AA-112-A	10405	A6010405012	100.000	A6010605015 A6120104017 A6110104026 A6101104014
K-BB-107-A	10305	D4010305024	100.000	D4010805015 D4120104020 D4110104029 D4100404045
K-BB-108-A	10305	A4010305025	100.000	A4010605014 A4120104016 A4110104025 A4100404039
K-BB-109-A	10305	A6010305026	100.000	A6010605015 A6120104017 A6110104026 A6101104014
K-BB-110-A	10305	D4010305027	100.000	D4010805015 D4120104020 D4110104029 D4100404045
K-CC-113-A	10405	D4010405013	100.000	D4010805015 D4120104020 D4110104029 D4100404045
K-CC-114-A	10405	A4010405014	100.000	A4010605014 A4120104016 A4110104025 A4100404039
K-CC-115-A	10405	A6010405015	100.000	A6010605015 A6120104017 A6110104026 A6101104014
K-CC-130-A	10505	A6010505016	100.000	A6010605015 A6120104017 A6110104026 A6101104014
K-CC-132-A	10505	D4010505017	100.000	D4010805015 D4120104020 D4110104029 D4100404045
K-CC-133-A	11805	A4011805008	100.000	A4010605014 A4120104016 A4110104025 A4100404039
S-K-116-A	10405	D4010405016	85.000	D4010805015 D4120104020 D4110104029 D4100404045
S-K-118-A	10505	A6010505013	85.000	A6010605015 A6120104017

A6110104026 A6101104014

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
S-R-117-A	10505	A4010505012	85.000	A4010605014 A4120104016 A4110104025 A4100404039
S-R-117-A RECOUNT	10605	A6010605013	85.000	A6010605015 A6120104017 A6110104026 A6101104014
S-R-119-A	10505	D4010505014	85.000	D4010805015 D4120104020 D4110104029 D4100404045
S-R-121-A	10505	A4010505015	85.000	A4010605014 A4120104016 A4110104025 A4100404039



## ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

Amchitka Island Environmental Analysis - Batch - 3 Gamma

REPORT PERIOD  
010305 TO 011705

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
K-CC-133-A	A4011805008	CO 60	( 3.2 +/- 0.9)E-03	5.38E-03	5.0 5.0 0.0	( 3.2 +/- 0.9)E-03
K-CC-133-A	A4011805008	CS 137	( 5.1 +/- 1.1)E-03	4.77E-03	5.0 5.0 0.0	( 5.1 +/- 1.2)E-03

Other gamma-emitting radionuclides determined to be true-positive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

Amchitka Island Environmental Analysis - Batch - 3 Gamma

MONITORING DATES  
010305 TO 011705

Customer ID	RML Sample ID	Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)

Requested gamma-emitting radionuclides determined to be false-positive.

K-CC-132-A	D4010505017	CS 137	1, 4, 6
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Other gamma-emitting radionuclides determined to be false-positive.

None

Number	Rejection Code Key Definition
1	Uncertainty to high to be accepted by analyst
2	Radionuclide had no supporting photopeaks to make a judgement
3	Peak width unacceptable by the analyst
4	Radionuclide results below decision critical level
5	Other radionuclide gamma-ray interferences
6	Graphical display of analyzed photopeaks showed unacceptable fitting results
7	No parent activity, therefore the state of equilibrium is unknown and the radionuclide cannot be quantified
8	Naturally occurring radionuclide with expected activity
9	Other

## Anchitka Island Environmental Analysis - Batch - 3 Gamma

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
010305 TO 011705

CUSTOMER ID	CO 60	MDL	CS 137	MDL	EU 152	MDL
K-AA-105-A	(-1.08 +/- 1.1)E-03	5.09E-03	(+7.10 +/- 16.)E-04	6.85E-03	(-4.26 +/- 2.2)E-03	9.66E-03
K-AA-106-A	(-1.72 +/- .99)E-03	4.49E-03	(-4.08 +/- 14.)E-04	6.02E-03	(-8.46 +/- 25.)E-04	1.05E-02
K-AA-111-A	(-2.38 +/- .98)E-03	4.63E-03	(+7.88 +/- 15.)E-04	6.45E-03	(-2.70 +/- 2.5)E-03	1.06E-02
K-AA-112-A	(-4.51 +/- 11.)E-04	4.83E-03	(-0.78 +/- 14.)E-04	5.85E-03	(+5.43 +/- 3.3)E-03	1.36E-02
K-BB-107-A	(-4.26 +/- 10.)E-04	4.54E-03	(-1.71 +/- 1.2)E-03	5.00E-03	(-3.12 +/- 2.4)E-03	1.00E-02
K-BB-108-A	(-1.31 +/- 1.2)E-03	5.72E-03	(-3.36 +/- 16.)E-04	6.75E-03	(-2.30 +/- 2.1)E-03	8.96E-03
K-BB-109-A	(+1.84 +/- 11.)E-04	5.09E-03	(+1.61 +/- 1.2)E-03	5.17E-03	(-7.75 +/- 25.)E-04	1.08E-02
K-BB-110-A	(+1.82 +/- 1.3)E-03	5.77E-03	(+1.14 +/- 1.3)E-03	5.39E-03	(+1.83 +/- 2.5)E-03	1.06E-02
K-CC-113-A	(-1.13 +/- 10.)E-04	4.55E-03	(+6.20 +/- 14.)E-04	5.95E-03	(+4.30 +/- 2.2)E-03	9.18E-03
K-CC-114-A	(-2.47 +/- 1.2)E-03	5.39E-03	(+1.30 +/- 1.5)E-03	6.57E-03	(-1.04 +/- 2.5)E-03	1.06E-02
K-CC-115-A	(+9.37 +/- 11.)E-04	5.09E-03	(+8.01 +/- 14.)E-04	5.87E-03	(+8.32 +/- 23.)E-04	9.87E-03
K-CC-130-A	(-2.05 +/- 1.0)E-03	4.65E-03	(+3.24 +/- 14.)E-04	6.08E-03	(-1.36 +/- 3.1)E-03	1.32E-02
K-CC-132-A	(+2.19 +/- 1.3)E-03	5.64E-03	(+2.75 +/- 1.3)E-03	5.52E-03	(+6.16 +/- 25.)E-04	1.04E-02
K-CC-133-A	(+3.25 +/- .91)E-03	5.38E-03	(+5.11 +/- 1.1)E-03	4.77E-03	(+2.93 +/- 1.8)E-03	7.75E-03
S-K-116-A	(+2.13 +/- 13.)E-04	5.79E-03	(-9.27 +/- 17.)E-04	6.96E-03	(+1.76 +/- 30.)E-04	1.27E-02
S-K-118-A	(-1.31 +/- 1.2)E-03	5.52E-03	(-2.64 +/- 1.6)E-03	6.94E-03	(-1.96 +/- 2.6)E-03	1.10E-02
S-R-117-A	(-2.62 +/- 1.4)E-03	6.68E-03	(+3.07 +/- 2.1)E-03	8.92E-03	(-2.77 +/- 3.0)E-03	1.31E-02
S-R-117-A RECOUNT	(-1.60 +/- 1.1)E-03	4.88E-03	(-2.58 +/- 1.7)E-03	7.15E-03	(-2.83 +/- 2.6)E-03	1.10E-02
S-R-119-A	(+1.31 +/- 14.)E-04	5.92E-03	(-2.49 +/- 11.)E-04	4.74E-03	(-2.31 +/- 2.9)E-03	1.22E-02
S-R-121-A	(-2.71 +/- 1.4)E-03	6.47E-03	(+1.36 +/- 2.0)E-03	8.71E-03	(-3.52 +/- 3.0)E-03	1.32E-02

NOTE: A plus sign before a parenthesis "+" indicates the activity is greater than 2 standard deviations, i.e. true positive.

Anchitka Island Environmental Analysis - Batch - 3 Gamma

NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD

010305 TO 011705

None

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

Amchitka Island Environmental Analysis - Batch -3 I-129

REPORT PERIOD  
010305 to 011305

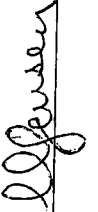
PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
01-JUN-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by



Approved by



## SAMPLE INFORMATION

Amchitka Island Environmental Analysis - Batch -3 I-129

FOR THE PERIOD  
010305 TO 011305

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
K-AA-105-A	10305	B4010305443	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-AA-106-A	10405	B4010405444	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-AA-111-A	10705	B4010705449	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-AA-112-A	10705	B4010705450	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-BB-107-A	10405	B4010405445	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-BB-108-A	10505	B4010505446	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-BB-108-A RECOUNT	10305	B4010305021	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-BB-109-A	10505	B4010505447	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-BB-110-A	10605	B4010605448	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-CC-113-A	10805	B4010805451	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-CC-114-A	10805	B4010805452	100.000	B4011405005 B4121104012 B4110604006 B4100404043

## SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID'S
K-CC-115-A	11005	B4011005453	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-CC-130-A	11305	B4011305459	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-CC-132-A	11305	B4011305460	100.000	B4011405005 B4121104012 B4110604006 B4100404043
K-CC-133-A	11705	B4011705463	100.000	B4011405005 B4121104012 B4110604006 B4100404043
S-K-116-A	11005	B4011005454	85.000	B4011405005 B4121104012 B4110604006 B4100404043
S-K-118-A	11105	B4011105456	85.000	B4011405005 B4121104012 B4110604006 B4100404043
S-R-117-A	11105	B4011105455	85.000	B4011405005 B4121104012 B4110604006 B4100404043
S-R-119-A	11205	B4011205457	85.000	B4011405005 B4121104012 B4110604006 B4100404043
S-R-121-A	11205	B4011205458	85.000	B4011405005 B4121104012 B4110604006 B4100404043



ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

Anchitka Island Environmental Analysis - Batch -3 I-129

REPORT PERIOD  
010305 TO 011305

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
K-CC-133-A	B4011705463	I 129	(9.8 +/- 0.7)E-03	2.71E-03	5.0 5.0 0.0	(9.8+/1.0)E-03

Other gamma-emitting radionuclides determined to be true-postive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

Amchitka Island Environmental Analysis - Batch -3 I-129

MONITORING DATES  
010305 TO 011305

Customer ID	RML Sample ID	Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)
_____	_____	_____	_____

Requested gamma-emitting radionuclides determined to be false-positive.

None

Other gamma-emitting radionuclides determined to be false-positive.

None

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
010305 TO 011305

CUSTOMER ID	I 129	MDL
K-AA-105-A	(-1.87 +/- 1.7)E-03	7.48E-03
K-AA-106-A	(-0.13 +/- 19.)E-04	8.16E-03
K-AA-111-A	(-0.52 +/- 21.)E-04	8.96E-03
K-AA-112-A	(+1.62 +/- 22.)E-04	9.37E-03
K-BB-107-A	(-2.02 +/- 1.8)E-03	7.81E-03
K-BB-108-A	(+1.19 +/- 1.8)E-03	8.02E-03
K-BB-108-A RECOUNT	(+6.85 +/- 19.)E-04	8.40E-03
K-BB-109-A	(+7.79 +/- 19.)E-04	8.47E-03
K-BB-110-A	(+2.54 +/- 2.0)E-03	8.73E-03
K-CC-113-A	(+1.82 +/- 1.9)E-03	8.15E-03
K-CC-114-A	(-1.93 +/- 19.)E-04	8.44E-03
K-CC-115-A	(+1.53 +/- 2.1)E-03	9.11E-03
K-CC-130-A	(-3.40 +/- 3.0)E-03	1.33E-02
K-CC-132-A	(+7.52 +/- 28.)E-04	1.24E-02
K-CC-133-A	+(+9.79 +/- .65)E-03	2.71E-03
S-K-116-A	(-1.46 +/- 1.5)E-03	6.64E-03
S-K-118-A	(-9.10 +/- 17.)E-04	7.30E-03
S-R-117-A	(+0.05 +/- 19.)E-04	8.21E-03
S-R-119-A	(-1.34 +/- 17.)E-04	7.37E-03
S-R-121-A	(+1.01 +/- 1.8)E-03	8.04E-03

NOTE: A plus sign before a parenthesis "+"(" indicates the activity is greater than 2 standard deviations, i.e. true positive.

Amchitka Island Environmental Analysis - Batch -3 I-129

NON-TARGET NUCLIDE SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
010305 TO 011305

None

**BATCH 4**  
**GAMMA**

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

REPORT PERIOD  
012405 to 012605

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
26-MAY-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by

Approved by

SAMPLE INFORMATION  
 AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS - BATCH 4 - GAMMA  
 FOR THE PERIOD  
 012405 TO 012605

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
B-K-152-A	12605	A6012605022	50.020	A6010605015 A6122004010 A6120104017 A6110104026
B-L-150-A	12405	A4012405016	28.629	A4010605014 A4120104016 A4110104025 A4100404039
B-L-151-A	12605	A4012605021	60.040	A4010605014 A4120104016 A4110104025 A4100404039
B-M-138-A	12505	D4012505016	40.141	D4010805015 D4120104020 D4110104029 D4100404045
B-M-139-A	12505	A4012505014	75.808	A4010605014 A4120104016 A4110104025 A4100404039
B-M-140-A	12405	D4012405021	87.952	D4010805015 D4120104020 D4110104029 D4100404045
B-M-141-A	12505	A6012505015	70.487	A6010605015 A6122004010 A6120104017 A6110104026
B-M-142-A	12405	D4012405018	31.678	D4010805015 D4120104020 D4110104029 D4100404045
B-M-143-A	12605	D4012605020	43.826	D4010805015 D4120104020 D4110104029 D4100404045
B-M-144-A	12605	A6012605019	87.828	A6010605015 A6122004010 A6120104017 A6110104026
B-M-145-A	12605	A4012605018	59.775	A4010605014 A4120104016 A4110104025 A4100404039
B-O-146-A	12505	A4012505011	81.801	A4010605014 A4120104016 A4110104025 A4100404039
B-O-146-A RECOUNT	12605	D4012605023	81.801	D4010805015 D4120104020 D4110104029 D4100404045
B-O-147-A	12505	A6012505012	88.222	A6010605015 A6122004010 A6120104017 A6110104026
B-O-148-A	12405	A6012405020	55.894	A6010605015 A6122004010 A6120104017 A6110104026
B-P-135-A	12405	A4012405019	21.603	A4010605014 A4120104016 A4110104025 A4100404039

SAMPLE INFORMATION CONTINUED

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (	LAB BACKGROUND
B-P-136-A	12505	D4012505013	42.933	D4010805015 D4120104020 D4110104029 D4100404045
B-P-137-A	12405	A6012405017	35.253	A6010605015 A6122004010 A6120104017 A6110104026



## ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

## AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS - BATCH 4 - GAMMA

REPORT PERIOD  
012405 TO 012605

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties & Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
B-K-152-A	A6012605022	CO 60	( 4.2 +/- 0.3)E-02	1.90E-02	5.0 5.0 0.0	( 4.2 +/- 0.5)E-02
B-K-152-A	A6012605022	CS 137	( 3.8 +/- 0.4)E-02	1.66E-02	5.0 5.0 0.0	( 3.8 +/- 0.5)E-02

Other gamma-emitting radionuclides determined to be true-positive

None

ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS - BATCH 4 - GAMMA

MONITORING DATES  
012405 TO 012605

Customer ID	RML Sample ID	Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)
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Requested gamma-emitting radionuclides determined to be false-positive.

B-O-147-A	A6012505012	CO 60	1, 4, 6
B-O-146-A	A4012505011	CS 137	1, 4, 6
B-P-135-A	A4012405019	CS 137	1, 4, 6
B-K-152-A	A6012605022	EU 152	1, 2, 4, 6

Other gamma-emitting radionuclides determined to be false-positive.

None

Number	Rejection Code Key Definition
1	Uncertainty to high to be accepted by analyst
2	Radionuclide had no supporting photopeaks to make a judgement
3	Peak width unacceptable by the analyst
4	Radionuclide results below decision critical level
5	Other radionuclide gamma-ray interferences
6	Graphical display of analyzed photopeaks showed unacceptable fitting results
7	No parent activity, therefore the state of equilibrium is unknown and the radionuclide cannot be quantified
8	Naturally occurring radionuclide with expected activity
9	Other

## AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS - BATCH 4 - GAMMA

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
012405 TO 012605

CUSTOMER ID	CO 60	MDL	CS 137	MDL	EU 152	MDL
B-K-152-A	+(+4.25 +/- .34)E-02	1.90E-02	+(+3.84 +/- .40)E-02	1.66E-02	+(+1.23 +/- .39)E-02	3.28E-02
B-L-150-A	(-9.35 +/- 4.4)E-03	2.05E-02	(+1.85 +/- 5.3)E-03	2.30E-02	(-2.89 +/- .88)E-02	3.82E-02
B-L-151-A	(-1.14 +/- 2.2)E-03	1.00E-02	(+1.91 +/- 2.6)E-03	1.11E-02	(-3.91 +/- 3.9)E-03	1.70E-02
B-M-138-A	(-1.06 +/- 3.4)E-03	1.49E-02	(-6.25 +/- 3.5)E-03	1.50E-02	(+5.30 +/- 6.8)E-03	2.85E-02
B-M-139-A	(-3.43 +/- 1.9)E-03	8.57E-03	(+2.12 +/- 2.1)E-03	9.04E-03	(-6.84 +/- 2.9)E-03	1.28E-02
B-M-140-A	(-1.52 +/- 1.4)E-03	6.36E-03	(+7.25 +/- 17.)E-04	7.28E-03	(-4.24 +/- 3.4)E-03	1.41E-02
B-M-141-A	(+3.63 +/- 1.9)E-03	8.46E-03	(+1.62 +/- 2.2)E-03	9.51E-03	(-3.59 +/- 3.6)E-03	1.54E-02
B-M-142-A	(-1.61 +/- 4.1)E-03	1.80E-02	(-5.06 +/- 4.7)E-03	2.00E-02	(+8.94 +/- 8.1)E-03	3.41E-02
B-M-143-A	(+5.56 +/- 3.0)E-03	1.32E-02	(-5.60 +/- 3.2)E-03	1.37E-02	(+9.91 +/- 5.7)E-03	2.42E-02
B-M-144-A	(+1.67 +/- 1.7)E-03	7.43E-03	(+1.41 +/- 1.7)E-03	7.32E-03	(+1.92 +/- 3.3)E-03	1.41E-02
B-M-145-A	(-5.08 +/- 1.9)E-03	8.97E-03	(+3.56 +/- 33.)E-04	1.42E-02	(-6.13 +/- 4.4)E-03	1.91E-02
B-O-146-A	(-2.98 +/- 1.7)E-03	7.62E-03	+(+4.54 +/- 2.0)E-03	8.68E-03	(-5.03 +/- 3.2)E-03	1.36E-02
B-O-146-A RECOUNT	(+1.93 +/- 1.9)E-03	8.06E-03	(-3.46 +/- 2.0)E-03	8.45E-03	(+3.86 +/- 3.4)E-03	1.42E-02
B-O-147-A	+(+3.96 +/- 1.6)E-03	7.10E-03	(+4.84 +/- 19.)E-04	8.17E-03	(+2.05 +/- 3.6)E-03	1.51E-02
B-O-148-A	(+1.13 +/- 2.6)E-03	1.14E-02	(-2.95 +/- 29.)E-04	1.22E-02	(+1.14 +/- .62)E-02	2.60E-02
B-P-135-A	(-8.44 +/- 5.8)E-03	2.69E-02	+(+1.68 +/- .62)E-02	2.70E-02	(-3.60 +/- 11.)E-03	4.72E-02
B-P-136-A	(-2.52 +/- 34.)E-04	1.49E-02	(-1.34 +/- 3.6)E-03	1.52E-02	(-7.72 +/- 5.9)E-03	2.51E-02
B-P-137-A	(+1.18 +/- 36.)E-04	1.61E-02	(+2.17 +/- 48.)E-04	2.04E-02	(-4.60 +/- 7.3)E-03	3.10E-02

NOTE: A plus sign before a parenthesis "+" indicates the activity is greater than 2 standard deviations, i.e. true positive.

**BATCH 5**  
**GAMMA**

021520056

GAMMA-RAY ANALYSIS RESULTS  
Computed by PCGAP(c) for Windows

AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)

REPORT PERIOD  
to

PREPARED BY THE  
RADIATION MEASUREMENT LABORATORY  
01-JUN-05

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY  
IDAHO FALLS, IDAHO

Analyzed by



Approved by



## SAMPLE INFORMATION

AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)

FOR THE PERIOD  
TO

CUSTOMER ID	COLLECTION DATE	RML SAMPLE ID	NET SAMPLE WEIGHT (GM)	LAB BACKGROUND ID(s)
B-A-163-A	22405	A6022405005	40.153	A6030105034 A6020205010 A6010605015 A6122004010
B-B-154-A	22305	A6022305010	47.188	A6030105034 A6020205010 A6010605015 A6122004010
B-C-162-A	22305	D4022305011	71.643	D4030105040 D4020205016 D4010805015 D4120104020
B-C-174-A	22505	D4022505013	49.972	D4030105040 D4020205016 D4010805015 D4120104020
B-J-167-A	22505	D4022505015	75.879	D4030105040 D4020205016 D4010805015 D4120104020
B-K-171-A	22405	A6022405002	50.110	A6030105034 A6020205010 A6010605015 A6122004010
B-K-172-A	22405	D4022405003	50.310	D4030105040 D4020205016 D4010805015 D4120104020
B-L-164-A	22405	D4022405006	40.592	D4030105040 D4020205016 D4010805015 D4120104020
B-L-164-A RECOUNT	31105	A6031105001	40.592	A6030105034 A6020205010 A6010605015 A6122004010

## ANALYST'S RESULTS OF MANMADE GAMMA-EMITTING RADIONUCLIDES

AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)

REPORT PERIOD  
TO

Customer ID	RML Sample ID	Radionuclide (gamma)	Activity(s) (BQ/GM)	MDL	Uncertainties % Geom. Eff. Other	Activity(T) (BQ/GM)
Requested gamma-emitting radionuclides determined to be true-positive						
B-K-172-A	D4022405003	CO 60	( 4.4 +/- 0.4)E-02	2.10E-02	5.0 5.0 0.0	( 4.4 +/- 0.5)E-02
B-K-172-A	D4022405003	CS 137	( 3.3 +/- 0.5)E-02	1.99E-02	5.0 5.0 0.0	( 3.3 +/- 0.5)E-02

Other gamma-emitting radionuclides determined to be true-postive

None



ANALYST'S RESULTS OF REJECTED GAMMA-EMITTING RADIONUCLIDES

AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)

Customer ID	RML Sample ID	MONITORING DATES		Radionuclide (gamma)	Analysis Rejection Code(s) (See the last page for the key.)
		TO	TO		

Requested gamma-emitting radionuclides determined to be false-positive.

B-C-162-A	D4022305011	CO 60	1,2,3,4,6
B-L-164-A	D4022405006	CS 137	1,4,6
B-K-171-A	A6022405002	EU 152	1,2,4,6

Other gamma-emitting radionuclides determined to be false-positive.

None

Number	Rejection Code Key Definition
1	Uncertainty to high to be accepted by analyst
2	Radionuclide had no supporting photopeaks to make a judgement
3	Peak width unacceptable by the analyst
4	Radionuclide results below decision critical level
5	Other radionuclide gamma-ray interferences
6	Graphical display of analyzed photopeaks showed unacceptable fitting results
7	No parent activity, therefore the state of equilibrium is unknown and the radionuclide cannot be quantified
8	Naturally occurring radionuclide with expected activity
9	Other

## AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)

## SAMPLE ACTIVITY AND MDL (BQ/GM)

FOR THE PERIOD  
TO

CUSTOMER ID	CO 60	MDL	CS 137	MDL	EU 152	MDL
B-A-163-A	(-3.03 +/- 2.8)E-03	1.27E-02	(+1.11 +/- 4.1)E-03	1.75E-02	(-2.03 +/- 7.1)E-03	3.02E-02
B-B-154-A	(+7.33 +/- 4.0)E-03	1.71E-02	(-4.98 +/- 3.5)E-03	1.47E-02	(+5.45 +/- 6.9)E-03	2.92E-02
B-C-162-A	(+4.61 +/- 1.5)E-03	6.79E-03	(+1.59 +/- 1.6)E-03	6.85E-03	(+1.26 +/- 4.5)E-03	1.86E-02
B-C-174-A	(+5.26 +/- 3.0)E-03	1.32E-02	(-2.30 +/- 3.0)E-03	1.25E-02	(-7.65 +/- 5.5)E-03	2.32E-02
B-J-167-A	(-1.12 +/- 2.0)E-03	8.79E-03	(-3.24 +/- 1.9)E-03	7.83E-03	(-2.46 +/- 3.5)E-03	1.48E-02
B-K-171-A	(+5.57 +/- 3.0)E-03	1.32E-02	(-8.42 +/- 3.8)E-03	1.61E-02	+(+1.34 +/- .54)E-02	2.31E-02
B-K-172-A	(+4.38 +/- .35)E-02	2.10E-02	+(+3.29 +/- .48)E-02	1.99E-02	(+5.38 +/- 5.2)E-03	2.19E-02
B-L-164-A	(-9.10 +/- 33.)E-04	1.44E-02	+(+9.75 +/- 4.0)E-03	1.67E-02	(+3.45 +/- 7.3)E-03	3.05E-02
B-L-164-A RECOUNT	(+1.19 +/- 3.0)E-03	1.35E-02	(+1.21 +/- 4.2)E-03	1.78E-02	(+1.68 +/- 63.)E-04	2.68E-02

NOTE: A plus sign before a parenthesis "+" indicates the activity is greater than 2 standard deviations, i.e. true positive.

AMCHITKA/CRESP SAMPLES (BATCH 5) (23FEB2005)  
NON-TARGET NUCLEIDE SAMPLE ACTIVITY AND MDL (BQ/GM)  
FOR THE PERIOD  
TO

None



**Appendix A-2**  
**Radiochemistry**  
**Alpha and Sr-90 Analysis**

**BATCH 1**  
**Sr-90**

05/26/2005

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Sr-90 Analysis for Amchitka Island (Batch 1)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF1 Method Type: A/B

Approved SAP No.: NA SDG No.: S-G-50-A

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>S-B-54-A</u>	<u>02EQ-05-A</u>
<u>S-B-55-A</u>	<u>02EQ-06-A</u>
<u>S-B-56-A</u>	<u>02EQ-07-A</u>
<u>S-G-50-A</u>	<u>02EQ-01-A</u>
<u>S-G-51-A</u>	<u>02EQ-02-A</u>
<u>S-G-52-A</u>	<u>02EQ-03-A</u>
<u>S-G-53-A</u>	<u>02EQ-04-A</u>
<u>S-K-70-A</u>	<u>02EQ-15-A</u>
<u>S-K-75-A</u>	<u>02EQ-20-A</u>
<u>S-L-57-A</u>	<u>02EQ-08-A</u>
<u>S-L-58-A</u>	<u>02EQ-09-A</u>
<u>S-L-59-A</u>	<u>02EQ-10-A</u>
<u>S-O-71-A</u>	<u>02EQ-16-A</u>
<u>S-O-73-A</u>	<u>02EQ-18-A</u>
<u>S-O-74-A</u>	<u>02EQ-19-A</u>
<u>S-P-67-A</u>	<u>02EQ-12-A</u>
<u>S-P-68-A</u>	<u>02EQ-13-A</u>
<u>S-P-69-A</u>	<u>02EQ-14-A</u>

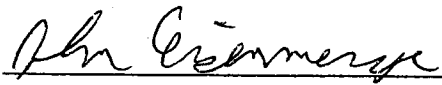
Comments: \_\_\_\_\_

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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature: 

Title: Technical Leader

Name: J. G. Eisenmenger

Date: 05/26/2005



## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF1SDG No.: S-G-50-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
S-B-54-A	02EQ-05-A	SoftTiss	SR90	+1.56E-04	+9.03E-05	Bq/g	03/09/05	11/18/04	85	85.7	B1	+3.30E-04	
S-B-55-A	02EQ-06-A	SoftTiss	SR90	+7.69E-05	+8.60E-05	Bq/g	03/09/05	11/18/04	85	88.2	B2	+3.19E-04	
S-B-56-A	02EQ-07-A	SoftTiss	SR90	+4.09E-05	+8.73E-05	Bq/g	03/09/05	11/18/04	85	86.6	B3	+3.25E-04	
S-G-50-A	02EQ-01-A	SoftTiss	SR90	+2.76E-05	+8.90E-05	Bq/g	03/09/05	11/18/04	85	87.6	A1	+3.27E-04	
S-G-51-A	02EQ-02-A	SoftTiss	SR90	+9.43E-06	+8.88E-05	Bq/g	03/09/05	11/18/04	85	84.7	A2	+3.32E-04	
S-G-52-A	02EQ-03-A	SoftTiss	SR90	-6.56E-05	+9.18E-05	Bq/g	03/09/05	11/18/04	85	83.9	A3	+3.40E-04	
S-G-53-A	02EQ-04-A	SoftTiss	SR90	-4.50E-05	+8.69E-05	Bq/g	03/09/05	11/18/04	85	87.6	A4	+3.24E-04	
S-K-70-A	02EQ-15-A	SoftTiss	SR90	+9.03E-05	+9.11E-05	Bq/g	03/09/05	11/18/04	85	92.6	B3	+3.37E-04	
S-K-75-A	02EQ-20-A	SoftTiss	SR90	+2.56E-02	+1.17E-03	Bq/g	03/09/05	11/18/04	85	85.4	A4	+4.28E-04	
S-L-57-A	02EQ-08-A	SoftTiss	SR90	+4.91E-05	+1.21E-04	Bq/g	03/09/05	11/18/04	70	86.8	A1	+4.44E-04	
S-L-58-A	02EQ-09-A	SoftTiss	SR90	+5.60E-05	+1.15E-04	Bq/g	03/09/05	11/18/04	70	88.1	A2	+4.29E-04	
S-L-59-A	02EQ-10-A	SoftTiss	SR90	-4.92E-05	+1.21E-04	Bq/g	03/09/05	11/18/04	70	85.6	A3	+4.48E-04	
S-O-71-A	02EQ-16-A	SoftTiss	SR90	+5.32E-05	+1.13E-04	Bq/g	03/09/05	11/18/04	85	88.8	A1	+4.15E-04	
S-O-73-A	02EQ-18-A	SoftTiss	SR90	+1.45E-04	+1.15E-04	Bq/g	03/09/05	11/18/04	85	84.7	A2	+4.26E-04	
S-O-74-A	02EQ-19-A	SoftTiss	SR90	-2.01E-04	+2.02E-04	Bq/g	03/09/05	11/18/04	85	48.1	A3	+7.52E-04	
S-P-67-A	02EQ-12-A	SoftTiss	SR90	-6.04E-05	+1.29E-04	Bq/g	03/09/05	11/18/04	65	85.5	A4	+4.81E-04	
S-P-68-A	02EQ-13-A	SoftTiss	SR90	-7.52E-05	+1.26E-04	Bq/g	03/09/05	11/18/04	65	86.6	B1	+4.72E-04	
S-P-69-A	02EQ-14-A	SoftTiss	SR90	+1.65E-05	+1.18E-04	Bq/g	03/09/05	11/18/04	65	91.8	B2	+4.44E-04	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF1SDG No.: S-G-50-A

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	+5.64E-03	+7.17E-03	NA	NA	Bq/spile	NA%	03/09/2005	88.7%	B4	+2.65E-02	
REAGENT	LCS	SR90	+6.71E+00	+3.08E-01	+7.10E+00	NA	Bq/mL	94.4%	03/09/2005	91.8%	B1	+6.74E-02	

See Key for Form II.

Comments:

Project: Sr-90 Analysis for Amchitka Island (Batch 1)  
Laboratory: RTC  
Report #: AmchitBatchF1  
SDG#: S-G-50-A

### Summary of 2 and 3 sigma activities

Below are the results for Sr-90 for Batch 1 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
S-K-75-A	02EQ-20-A	SR90	2.56E-02	1.17E-03	21.9

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 2**  
**Sr-90**

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RADIOANALYTICAL ANALYSES DATA PACKAGE

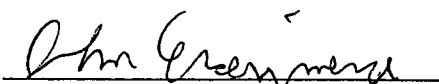
Project Title:	<u>Sr-90 Analysis for Amchitka Island (Batch 2-1)</u>		
Lab Name:	<u>RTC</u>	Case No:	<u>NA</u>
Report No.:	<u>AmchitBatchF2-1</u>	Method Type:	<u>B</u>
Approved SAP No.:	<u>NA</u>	SDG No.:	<u>S-U-76-C</u>

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>S-U-76-C</u>	<u>02FX-01-A</u>
<u>S-U-77-C</u>	<u>02FX-02-A</u>
<u>S-U-90-C</u>	<u>02FX-03-A</u>
<u>S-U-96-C</u>	<u>02FX-04-A</u>

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF2-1SDG No.: S-U-76-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uner +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
S-U-76-C	02FX-01-A	SoftTiss	SR90	-5.78E-05	+1.84E-04	Bq/g	02/03/05	12/02/04	50	68.5	B1	+7.66E-04	
S-U-77-C	02FX-02-A	SoftTiss	SR90	+9.91E-05	+1.86E-04	Bq/g	02/03/05	12/02/04	50	68.4	B2	+7.68E-04	
S-U-90-C	02FX-03-A	SoftTiss	SR90	+6.15E-05	+1.51E-04	Bq/g	02/03/05	12/02/04	50	83.7	B3	+6.25E-04	
S-U-96-C	02FX-04-A	SoftTiss	SR90	-4.43E-05	+1.59E-04	Bq/g	02/03/05	12/02/04	50	79.2	B4	+6.60E-04	

See Key for Form I.

Comments:

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RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF2-1SDG No.: S-U-76-C

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
Reagent	BLK	SR90	+3.51E-03	+6.86E-03	NA	NA	Bq/spile	NA%	02/03/2005	92.9%	A3	+2.81E-02	
Reagent	LCS	SR90	+6.74E+00	+3.10E-01	+7.10E+00	NA	Bq/mL	94.9%	02/03/2005	83.6%	A4	+6.33E-02	

See Key for Form II.

Comments:

Project: Sr-90 Analysis for Amchitka Island (Batch 2-1)  
Laboratory: RTC  
Report #: AmchitBatchF2-1  
SDG#: S-U-76-C

### Summary of 2 and 3 sigma activities

There were no results for Sr-90 for Batch 2-1 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).



05/26/2005

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RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Sr-90 Analysis for Amchitka Island (Batch 2-2)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF2-2 Method Type: A/B


Approved SAP No.: NA SDG No.: S-K-60-A

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>S-K-60-A</u>	<u>02FP-09-A</u>
<u>S-K-61-A</u>	<u>02FP-10-A</u>
<u>S-K-63-A</u>	<u>02FP-11-A</u>
<u>S-K-88-A</u>	<u>02FP-12-A</u>
<u>S-K-89-A</u>	<u>02FP-13-A</u>
<u>S-M-80-A</u>	<u>02FP-01-A</u>
<u>S-M-81-A</u>	<u>02FP-02-A</u>
<u>S-M-82-A</u>	<u>02FP-03-A</u>
<u>S-M-83-A</u>	<u>02FP-04-A</u>
<u>S-M-84-A</u>	<u>02FP-05-A</u>
<u>S-M-85-A</u>	<u>02FP-06-A</u>
<u>S-M-86-A</u>	<u>02FP-07-A</u>
<u>S-M-87-A</u>	<u>02FP-08-A</u>
<u>S-U-76-A</u>	<u>02FP-14-A</u>
<u>S-U-77-A</u>	<u>02FP-15-A</u>
<u>S-U-90-A</u>	<u>02FP-16-A</u>
<u>S-U-96-A</u>	<u>02FP-17-A</u>
<u>S-VN-102-A</u>	<u>02FP-18-A</u>
<u>S-VN-103-A</u>	<u>02FP-19-A</u>
<u>S-VN-104-A</u>	<u>02FP-20-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RICCase No: NAReport No.: AmchitBatchF2-2SDG No.: S-K-60-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
S-K-60-A	02FP-09-A	Softtiss	SR90	+3.16E-05	+8.68E-05	Bq/g	04/06/05	12/02/04	85	87.7	A2	+3.57E-04	
S-K-61-A	02FP-10-A	Softtiss	SR90	-1.38E-04	+8.55E-05	Bq/g	04/06/05	12/02/04	85	88.3	A3	+3.57E-04	
S-K-63-A	02FP-11-A	Softtiss	SR90	-3.69E-05	+8.36E-05	Bq/g	04/06/05	12/02/04	85	90.0	A4	+3.47E-04	
S-K-88-A	02FP-12-A	Softtiss	SR90	-8.03E-05	+8.35E-05	Bq/g	04/06/05	12/02/04	85	89.7	B1	+3.48E-04	
S-K-89-A	02FP-13-A	Softtiss	SR90	+2.33E-02	+6.99E-04	Bq/g	04/06/05	12/02/04	85	86.5	B2	+3.60E-04	
S-M-80-A	02FP-01-A	Softtiss	SR90	+2.60E-05	+7.59E-05	Bq/g	04/06/05	12/02/04	100	79.1	A1	+3.11E-04	
S-M-81-A	02FP-02-A	Softtiss	SR90	+3.54E-05	+6.95E-05	Bq/g	04/06/05	12/02/04	100	85.5	A2	+2.85E-04	
S-M-82-A	02FP-03-A	Softtiss	SR90	-2.03E-05	+6.58E-05	Bq/g	04/06/05	12/02/04	100	90.5	A3	+2.72E-04	
S-M-83-A	02FP-04-A	Softtiss	SR90	-3.99E-06	+7.26E-05	Bq/g	04/06/05	12/02/04	100	81.2	A4	+3.00E-04	
S-M-84-A	02FP-05-A	Softtiss	SR90	+4.18E-05	+6.75E-05	Bq/g	04/06/05	12/02/04	100	88.1	B1	+2.77E-04	
S-M-85-A	02FP-06-A	Softtiss	SR90	-2.52E-05	+6.49E-05	Bq/g	04/06/05	12/02/04	100	89.9	B2	+2.70E-04	
S-M-86-A	02FP-07-A	Softtiss	SR90	-3.47E-06	+6.24E-05	Bq/g	04/06/05	12/02/04	100	93.5	B3	+2.59E-04	
S-M-87-A	02FP-08-A	Softtiss	SR90	-6.10E-05	+7.13E-05	Bq/g	04/06/05	12/02/04	100	90.6	A1	+2.95E-04	
S-U-76-A	02FP-14-A	Softtiss	SR90	+2.80E-05	+8.43E-05	Bq/g	04/06/05	12/02/04	85	88.8	B3	+3.49E-04	
S-U-77-A	02FP-15-A	Softtiss	SR90	-6.43E-06	+8.89E-05	Bq/g	04/06/05	12/02/04	85	93.5	A1	+3.66E-04	
S-U-90-A	02FP-16-A	Softtiss	SR90	+3.54E-05	+1.29E-04	Bq/g	04/06/05	12/02/04	85	63.6	A2	+5.33E-04	
S-U-96-A	02FP-17-A	Softtiss	SR90	-2.70E-05	+1.06E-04	Bq/g	04/06/05	12/02/04	85	78.0	A3	+4.38E-04	
S-VN-102-A	02FP-18-A	Softtiss	SR90	+1.24E-05	+7.53E-05	Bq/g	04/06/05	12/02/04	100	92.9	A4	+3.10E-04	
S-VN-103-A	02FP-19-A	Softtiss	SR90	-5.16E-05	+7.56E-05	Bq/g	04/06/05	12/02/04	100	91.6	B1	+3.14E-04	
S-VN-104-A	02FP-20-A	Softtiss	SR90	-1.18E-05	+8.00E-05	Bq/g	04/06/05	12/02/04	100	86.6	B2	+3.31E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF2-2SDG No.: S-K-60-A

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uner +/-	Known Value	Known Uner +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	+1.08E-02	+6.25E-03	NA	NA	Bq/spl	NA%	04/06/2005	94.1%	B4	+2.54E-02	
REAGENT	LCS	SR90	+6.36E+00	+1.90E-01	+7.10E+00	NA	Bq/mL	89.5%	04/06/2005	99.0%	B3	+5.79E-02	
REAGENT	LCS	SR90	+6.42E+00	+1.92E-01	+7.10E+00	NA	Bq/mL	90.4%	04/06/2005	100.9%	B4	+5.71E-02	
REAGENT	BLK	SR90	-1.02E-03	-6.88E-03	NA	NA	Bq/spl	NA%	04/06/2005	91.2%	B4	+2.85E-02	

See Key for Form II.

Comments:

Project: Sr-90 Analysis for Amchitka Island (Batch 2-2)  
Laboratory: RTC  
Report #: AmchitBatchF2-2  
SDG#: S-K-60-A

### Summary of 2 and 3 sigma activities

Below are the results for Sr-90 for Batch 2-2 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
S-K-89-A	02FP-13-A	SR90	2.33E-02	6.99E-04	33.3

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 3**  
**ALPHA AND Sr-90**

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RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Alpha and Sr-90 Analysis for Amchitka Island (Batch 3)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF3 Method Type: A/B

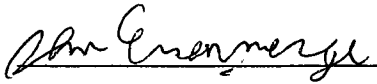
Approved SAP No.: NA SDG No.: K-AA-105-C

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>K-AA-105-C</u>	<u>02GO-05-A</u>
<u>K-AA-106-C</u>	<u>02GO-06-A</u>
<u>K-AA-111-C</u>	<u>02GO-11-A</u>
<u>K-AA-112-C</u>	<u>02GO-12-A</u>
<u>K-BB-107-C</u>	<u>02GO-07-A</u>
<u>K-BB-108-C</u>	<u>02GO-08-A</u>
<u>K-BB-109-C</u>	<u>02GO-09-A</u>
<u>K-BB-110-C</u>	<u>02GO-10-A</u>
<u>K-CC-113-C</u>	<u>02GO-13-A</u>
<u>K-CC-114-C</u>	<u>02GO-14-A</u>
<u>K-CC-115-C</u>	<u>02GO-01-A</u>
<u>K-CC-130-C</u>	<u>02GO-02-A</u>
<u>K-CC-132-C</u>	<u>02GO-03-A</u>
<u>K-CC-133-C</u>	<u>02GO-04-A</u>
<u>S-R-117-C</u>	<u>02GO-15-A</u>
<u>S-R-119-C</u>	<u>02GO-16-A</u>
<u>S-R-121-C</u>	<u>02GO-17-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF3

Case No: NA  
SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-105-C	02GO-05-A	Kelp	SR90	+3.54E-04	+4.60E-04	Bq/g	02/15/05	12/17/04	12	101.4	B1	+1.89E-03	
K-AA-105-C	02GO-05-A	Kelp	U234	+6.55E-04	+1.57E-04	Bq/g	02/21/05	12/17/04	12	100.5	08	+4.75E-05	
K-AA-105-C	02GO-05-A	Kelp	U235	+5.84E-06	+3.88E-05	Bq/g	02/21/05	12/17/04	12	100.5	08	+5.31E-05	
K-AA-105-C	02GO-05-A	Kelp	U238	+6.17E-04	+1.58E-04	Bq/g	02/21/05	12/17/04	12	100.5	08	+4.22E-05	
K-AA-105-C	02GO-05-A	Kelp	PU238	+8.49E-06	+3.46E-05	Bq/g	02/22/05	12/17/04	12	87.8	13	+3.73E-05	
K-AA-105-C	02GO-05-A	Kelp	PU239/240	+4.61E-05	+3.03E-05	Bq/g	02/22/05	12/17/04	12	87.8	13	+5.27E-05	
K-AA-105-C	02GO-05-A	Kelp	AM241	+1.75E-05	+3.85E-05	Bq/g	02/21/05	12/17/04	12	98.2	13	+2.80E-05	
K-AA-105-C	02GO-05-A	Kelp	U236	+6.83E-06	+1.04E-05	Bq/g	02/21/05	12/17/04	12	100.5	08	+1.85E-05	
K-AA-106-C	02GO-06-A	Kelp	SR90	+5.39E-04	+4.84E-04	Bq/g	02/15/05	12/17/04	12	94.9	B2	+1.99E-03	
K-AA-106-C	02GO-06-A	Kelp	U234	+8.10E-04	+1.73E-04	Bq/g	02/21/05	12/17/04	12	98.0	03	+4.63E-05	
K-AA-106-C	02GO-06-A	Kelp	U235	+3.53E-06	+3.60E-05	Bq/g	02/21/05	12/17/04	12	98.0	03	+4.73E-05	
K-AA-106-C	02GO-06-A	Kelp	U238	+7.30E-04	+1.70E-04	Bq/g	02/21/05	12/17/04	12	98.0	03	+4.63E-05	
K-AA-106-C	02GO-06-A	Kelp	PU238	+2.10E-05	+4.56E-05	Bq/g	02/22/05	12/17/04	12	85.7	14	+3.78E-05	
K-AA-106-C	02GO-06-A	Kelp	PU239/240	+1.25E-06	+2.35E-05	Bq/g	02/22/05	12/17/04	12	85.7	14	+4.67E-05	
K-AA-106-C	02GO-06-A	Kelp	AM241	-1.64E-05	+3.61E-05	Bq/g	02/21/05	12/17/04	12	95.1	14	+3.43E-05	
K-AA-106-C	02GO-06-A	Kelp	U236	+4.39E-06	+7.04E-06	Bq/g	02/21/05	12/17/04	12	98.0	03	+3.14E-05	
K-AA-111-C	02GO-11-A	Kelp	SR90	+3.97E-04	+5.69E-04	Bq/g	02/16/05	12/17/04	12	92.0	A3	+2.34E-03	
K-AA-111-C	02GO-11-A	Kelp	U234	+1.31E-03	+2.47E-04	Bq/g	02/22/05	12/17/04	12	87.8	03	+7.10E-05	
K-AA-111-C	02GO-11-A	Kelp	U235	+3.61E-05	+3.47E-05	Bq/g	02/22/05	12/17/04	12	87.8	03	+2.31E-05	
K-AA-111-C	02GO-11-A	Kelp	U238	+1.19E-03	+2.47E-04	Bq/g	02/22/05	12/17/04	12	87.8	03	+4.19E-05	
K-AA-111-C	02GO-11-A	Kelp	PU238	-1.96E-06	+2.39E-05	Bq/g	02/22/05	12/17/04	12	89.9	11	+3.10E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RICCase No: NAReport No.: AmchitBatchF3SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-111-C	02GO-11-A	Kelp	PU239/240	+6.05E-06	+2.81E-05	Bq/g	02/22/05	12/17/04	12	89.9	11	+3.11E-05	
K-AA-111-C	02GO-11-A	Kelp	AM241	+2.40E-05	+3.94E-05	Bq/g	02/21/05	12/17/04	12	89.9	11	+1.64E-05	
K-AA-111-C	02GO-11-A	Kelp	U236	-5.65E-06	+9.39E-06	Bq/g	02/22/05	12/17/04	12	87.8	03	+4.72E-05	
K-AA-112-C	02GO-12-A	Kelp	SR90	+4.75E-04	+5.57E-04	Bq/g	02/16/05	12/17/04	12	93.0	A4	+2.30E-03	
K-AA-112-C	02GO-12-A	Kelp	U234	+7.34E-04	+1.66E-04	Bq/g	02/22/05	12/17/04	12	105.7	04	+4.56E-05	
K-AA-112-C	02GO-12-A	Kelp	U235	+1.09E-05	+4.47E-05	Bq/g	02/22/05	12/17/04	12	105.7	04	+5.74E-05	
K-AA-112-C	02GO-12-A	Kelp	U238	+5.51E-04	+1.46E-04	Bq/g	02/22/05	12/17/04	12	105.7	04	+6.32E-05	
K-AA-112-C	02GO-12-A	Kelp	PU238	-1.76E-05	+2.02E-05	Bq/g	02/22/05	12/17/04	12	85.4	12	+4.46E-05	
K-AA-112-C	02GO-12-A	Kelp	PU239/240	-4.64E-06	+1.80E-05	Bq/g	02/22/05	12/17/04	12	85.4	12	+4.88E-05	
K-AA-112-C	02GO-12-A	Kelp	AM241	-1.16E-06	+4.67E-05	Bq/g	02/21/05	12/17/04	12	98.6	12	+3.88E-05	
K-AA-112-C	02GO-12-A	Kelp	U236	+6.55E-06	+9.99E-06	Bq/g	02/22/05	12/17/04	12	105.7	04	+1.77E-05	
K-BB-107-C	02GO-07-A	Kelp	SR90	+4.03E-04	+4.92E-04	Bq/g	02/15/05	12/17/04	12	93.1	B3	+2.03E-03	
K-BB-107-C	02GO-07-A	Kelp	U234	+2.20E-04	+9.51E-05	Bq/g	02/21/05	12/17/04	12	101.4	04	+5.59E-05	
K-BB-107-C	02GO-07-A	Kelp	U235	-1.61E-05	+2.29E-05	Bq/g	02/21/05	12/17/04	12	101.4	04	+6.55E-05	
K-BB-107-C	02GO-07-A	Kelp	U238	+1.92E-04	+8.72E-05	Bq/g	02/21/05	12/17/04	12	101.4	04	+4.75E-05	
K-BB-107-C	02GO-07-A	Kelp	PU238	-6.53E-06	+2.02E-05	Bq/g	02/22/05	12/17/04	12	89.6	15	+1.57E-05	
K-BB-107-C	02GO-07-A	Kelp	PU239/240	+1.70E-05	+3.70E-05	Bq/g	02/22/05	12/17/04	12	89.6	15	+2.99E-05	
K-BB-107-C	02GO-07-A	Kelp	AM241	-6.78E-06	+4.19E-05	Bq/g	02/21/05	12/17/04	12	101.9	15	+3.16E-05	
K-BB-107-C	02GO-07-A	Kelp	U236	+6.83E-06	+1.04E-05	Bq/g	02/21/05	12/17/04	12	101.4	04	+1.85E-05	
K-BB-108-C	02GO-08-A	Kelp	SR90	-4.57E-05	+4.96E-04	Bq/g	02/15/05	12/17/04	12	93.1	B4	+2.06E-03	
K-BB-108-C	02GO-08-A	Kelp	U234	+2.91E-04	+1.04E-04	Bq/g	02/21/05	12/17/04	12	106.3	05	+5.65E-05	

See Key for Form I.

Comments:



05/26/05

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF3SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-BB-108-C	02GO-08-A	Kelp	U235	+2.92E-05	+6.09E-05	Bq/g	02/21/05	12/17/04	12	106.3	05	+5.04E-05	
K-BB-108-C	02GO-08-A	Kelp	U238	+3.96E-04	+1.20E-04	Bq/g	02/21/05	12/17/04	12	106.3	05	+4.93E-05	
K-BB-108-C	02GO-08-A	Kelp	PU238	-9.46E-06	+1.89E-05	Bq/g	02/22/05	12/17/04	12	84.9	16	+3.98E-05	
K-BB-108-C	02GO-08-A	Kelp	PU239/240	+3.12E-05	+2.62E-05	Bq/g	02/22/05	12/17/04	12	84.9	16	+3.98E-05	
K-BB-108-C	02GO-08-A	Kelp	AM241	+1.06E-05	+5.48E-05	Bq/g	02/21/05	12/17/04	12	96.7	16	+3.96E-05	
K-BB-108-C	02GO-08-A	Kelp	U236	+1.29E-05	+1.78E-05	Bq/g	02/21/05	12/17/04	12	106.3	05	+1.75E-05	
K-BB-109-C	02GO-09-A	Kelp	SR90	+2.79E-04	+5.68E-04	Bq/g	02/16/05	12/17/04	12	93.1	A1	+2.33E-03	
K-BB-109-C	02GO-09-A	Kelp	U234	+7.03E-04	+1.62E-04	Bq/g	02/21/05	12/17/04	12	103.1	06	+1.81E-05	
K-BB-109-C	02GO-09-A	Kelp	U235	+2.22E-05	+5.59E-05	Bq/g	02/21/05	12/17/04	12	103.1	06	+5.20E-05	
K-BB-109-C	02GO-09-A	Kelp	U238	+7.47E-04	+1.77E-04	Bq/g	02/21/05	12/17/04	12	103.1	06	+4.65E-05	
K-BB-109-C	02GO-09-A	Kelp	PU238	+1.45E-05	+2.40E-05	Bq/g	02/22/05	12/17/04	12	80.4	09	+1.81E-05	
K-BB-109-C	02GO-09-A	Kelp	PU239/240	+2.07E-04	+5.85E-05	Bq/g	02/22/05	12/17/04	12	80.4	09	+4.14E-05	
K-BB-109-C	02GO-09-A	Kelp	AM241	+5.19E-06	+4.98E-05	Bq/g	02/21/05	12/17/04	12	99.7	09	+3.36E-05	
K-BB-109-C	02GO-09-A	Kelp	U236	+1.33E-05	+1.83E-05	Bq/g	02/21/05	12/17/04	12	103.1	06	+1.81E-05	
K-BB-110-C	02GO-10-A	Kelp	SR90	+5.51E-04	+5.65E-04	Bq/g	02/16/05	12/17/04	12	92.3	A2	+2.32E-03	
K-BB-110-C	02GO-10-A	Kelp	U234	+6.87E-04	+1.65E-04	Bq/g	02/21/05	12/17/04	12	94.7	08	+5.04E-05	
K-BB-110-C	02GO-10-A	Kelp	U235	+1.62E-05	+5.05E-05	Bq/g	02/21/05	12/17/04	12	94.7	08	+5.63E-05	
K-BB-110-C	02GO-10-A	Kelp	U238	+7.98E-04	+1.89E-04	Bq/g	02/21/05	12/17/04	12	94.7	08	+4.47E-05	
K-BB-110-C	02GO-10-A	Kelp	PU238	-1.56E-05	+1.91E-05	Bq/g	02/22/05	12/17/04	12	89.4	10	+3.68E-05	
K-BB-110-C	02GO-10-A	Kelp	PU239/240	+4.70E-05	+2.99E-05	Bq/g	02/22/05	12/17/04	12	89.4	10	+4.88E-05	
K-BB-110-C	02GO-10-A	Kelp	AM241	-1.87E-06	+4.60E-05	Bq/g	02/21/05	12/17/04	12	99.0	10	+3.76E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF3SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-BB-110-C	02GO-10-A	Kelp	U236	+2.17E-05	+1.51E-05	Bq/g	02/21/05	12/17/04	12	94.7	08	+1.96E-05	
K-CC-113-C	02GO-13-A	Kelp	SR90	+2.74E-04	+5.53E-04	Bq/g	02/16/05	12/17/04	12	94.7	B1	+2.28E-03	
K-CC-113-C	02GO-13-A	Kelp	U234	+3.46E-03	+5.04E-04	Bq/g	02/22/05	12/17/04	12	110.0	05	+3.87E-05	
K-CC-113-C	02GO-13-A	Kelp	U235	+1.74E-04	+6.16E-05	Bq/g	02/22/05	12/17/04	12	110.0	05	+2.14E-05	
K-CC-113-C	02GO-13-A	Kelp	U238	+3.03E-03	+5.01E-04	Bq/g	02/22/05	12/17/04	12	110.0	05	+5.13E-05	
K-CC-113-C	02GO-13-A	Kelp	PU238	-9.63E-06	+1.88E-05	Bq/g	02/22/05	12/17/04	12	87.4	13	+3.75E-05	
K-CC-113-C	02GO-13-A	Kelp	PU239/240	+5.85E-05	+3.26E-05	Bq/g	02/22/05	12/17/04	12	87.4	13	+5.29E-05	
K-CC-113-C	02GO-13-A	Kelp	AM241	+3.46E-05	+3.99E-05	Bq/g	02/21/05	12/17/04	12	106.0	13	+2.60E-05	
K-CC-113-C	02GO-13-A	Kelp	U236	+2.96E-05	+3.73E-05	Bq/g	02/22/05	12/17/04	12	110.0	05	+3.23E-05	
K-CC-114-C	02GO-14-A	Kelp	SR90	+5.96E-04	+5.62E-04	Bq/g	02/16/05	12/17/04	12	92.0	B2	+2.32E-03	
K-CC-114-C	02GO-14-A	Kelp	U234	+2.06E-03	+3.35E-04	Bq/g	02/22/05	12/17/04	12	110.7	06	+5.42E-05	
K-CC-114-C	02GO-14-A	Kelp	U235	+9.59E-05	+4.79E-05	Bq/g	02/22/05	12/17/04	12	110.7	06	+5.45E-05	
K-CC-114-C	02GO-14-A	Kelp	U238	+1.91E-03	+3.46E-04	Bq/g	02/22/05	12/17/04	12	110.7	06	+5.42E-05	
K-CC-114-C	02GO-14-A	Kelp	PU238	-9.91E-06	+1.87E-05	Bq/g	02/22/05	12/17/04	12	96.4	14	+3.36E-05	
K-CC-114-C	02GO-14-A	Kelp	PU239/240	+2.41E-05	+4.88E-05	Bq/g	02/22/05	12/17/04	12	96.4	14	+4.75E-05	
K-CC-114-C	02GO-14-A	Kelp	AM241	-1.20E-05	+3.84E-05	Bq/g	02/21/05	12/17/04	12	104.1	14	+3.13E-05	
K-CC-114-C	02GO-14-A	Kelp	U236	+2.94E-05	+3.71E-05	Bq/g	02/22/05	12/17/04	12	110.7	06	+3.21E-05	
K-CC-115-C	02GO-01-A	Kelp	SR90	+7.31E-04	+4.89E-04	Bq/g	02/15/05	12/17/04	12	96.9	A1	+1.99E-03	
K-CC-115-C	02GO-01-A	Kelp	U234	+4.35E-03	+6.06E-04	Bq/g	02/21/05	12/17/04	12	97.3	03	+4.66E-05	
K-CC-115-C	02GO-01-A	Kelp	U235	+2.27E-04	+7.14E-05	Bq/g	02/21/05	12/17/04	12	97.3	03	+4.76E-05	
K-CC-115-C	02GO-01-A	Kelp	U238	+3.57E-03	+5.73E-04	Bq/g	02/21/05	12/17/04	12	97.3	03	+3.78E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
 Report No.: AmchitBatchF3

Case No: NA  
 SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-115-C	02GO-01-A	Kelp	PU238	+6.35E-06	+2.20E-05	Bq/g	02/22/05	12/17/04	12	86.6	09	+1.68E-05	
K-CC-115-C	02GO-01-A	Kelp	PU239/240	+1.73E-05	+4.03E-05	Bq/g	02/22/05	12/17/04	12	86.6	09	+3.85E-05	
K-CC-115-C	02GO-01-A	Kelp	AM241	-1.10E-05	+3.91E-05	Bq/g	02/21/05	12/17/04	12	99.0	09	+3.38E-05	
K-CC-115-C	02GO-01-A	Kelp	U236	+1.22E-05	+1.68E-05	Bq/g	02/21/05	12/17/04	12	97.3	03	+1.66E-05	
K-CC-130-C	02GO-02-A	Kelp	SR90	+3.46E-04	+4.81E-04	Bq/g	02/15/05	12/17/04	12	96.2	A2	+1.98E-03	
K-CC-130-C	02GO-02-A	Kelp	U234	+2.29E-03	+3.68E-04	Bq/g	02/21/05	12/17/04	12	105.2	04	+5.39E-05	
K-CC-130-C	02GO-02-A	Kelp	U235	+1.16E-04	+5.35E-05	Bq/g	02/21/05	12/17/04	12	105.2	04	+6.31E-05	
K-CC-130-C	02GO-02-A	Kelp	U238	+2.11E-03	+3.78E-04	Bq/g	02/21/05	12/17/04	12	105.2	04	+4.58E-05	
K-CC-130-C	02GO-02-A	Kelp	PU238	-1.55E-05	+1.90E-05	Bq/g	02/22/05	12/17/04	12	92.5	10	+3.55E-05	
K-CC-130-C	02GO-02-A	Kelp	PU239/240	+2.20E-05	+4.66E-05	Bq/g	02/22/05	12/17/04	12	92.5	10	+4.72E-05	
K-CC-130-C	02GO-02-A	Kelp	AM241	+3.50E-06	+5.00E-05	Bq/g	02/21/05	12/17/04	12	99.2	10	+3.76E-05	
K-CC-130-C	02GO-02-A	Kelp	U236	+4.42E-05	+2.29E-05	Bq/g	02/21/05	12/17/04	12	105.2	04	+3.40E-05	
K-CC-132-C	02GO-03-A	Kelp	SR90	+3.41E-02	+1.70E-03	Bq/g	02/15/05	12/17/04	12	96.0	A3	+1.99E-03	
K-CC-132-C	02GO-03-A	Kelp	U234	+8.18E-04	+1.81E-04	Bq/g	02/21/05	12/17/04	12	99.8	05	+5.65E-05	
K-CC-132-C	02GO-03-A	Kelp	U235	+8.49E-06	+4.11E-05	Bq/g	02/21/05	12/17/04	12	99.8	05	+4.49E-05	
K-CC-132-C	02GO-03-A	Kelp	U238	+7.39E-04	+1.77E-04	Bq/g	02/21/05	12/17/04	12	99.8	05	+5.26E-05	
K-CC-132-C	02GO-03-A	Kelp	PU238	+5.16E-03	+5.85E-04	Bq/g	02/22/05	12/17/04	12	87.0	11	+3.21E-05	
K-CC-132-C	02GO-03-A	Kelp	PU239/240	+2.52E-05	+2.42E-05	Bq/g	02/22/05	12/17/04	12	87.0	11	+3.21E-05	
K-CC-132-C	02GO-03-A	Kelp	AM241	+7.80E-03	+6.34E-04	Bq/g	02/21/05	12/17/04	12	104.2	11	+1.41E-05	
K-CC-132-C	02GO-03-A	Kelp	U236	+6.91E-06	+1.05E-05	Bq/g	02/21/05	12/17/04	12	99.8	05	+1.87E-05	
K-CC-133-C	02GO-04-A	Kelp	SR90	+9.13E-03	+7.21E-04	Bq/g	02/15/05	12/17/04	12	88.3	A4	+2.15E-03	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF3SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-133-C	02GO-04-A	Kelp	U234	+8.90E-04	+1.90E-04	Bq/g	02/21/05	12/17/04	12	101.4	06	+4.19E-05	
K-CC-133-C	02GO-04-A	Kelp	U235	+1.42E-05	+4.80E-05	Bq/g	02/21/05	12/17/04	12	101.4	06	+5.28E-05	
K-CC-133-C	02GO-04-A	Kelp	U238	+7.41E-04	+1.77E-04	Bq/g	02/21/05	12/17/04	12	101.4	06	+4.72E-05	
K-CC-133-C	02GO-04-A	Kelp	PU238	+1.89E-05	+2.46E-05	Bq/g	02/22/05	12/17/04	12	87.5	12	+1.69E-05	
K-CC-133-C	02GO-04-A	Kelp	PU239/240	+3.35E-03	+4.10E-04	Bq/g	02/22/05	12/17/04	12	87.5	12	+4.35E-05	
K-CC-133-C	02GO-04-A	Kelp	AM241	+2.33E-03	+2.56E-04	Bq/g	02/21/05	12/17/04	12	93.9	12	+4.08E-05	
K-CC-133-C	02GO-04-A	Kelp	U236	+6.79E-06	+1.03E-05	Bq/g	02/21/05	12/17/04	12	101.4	06	+1.84E-05	
S-R-117-C	02GO-15-A	SoftTiss	SR90	+4.83E-04	+3.05E-04	Bq/g	02/16/05	12/17/04	22	93.4	B3	+1.25E-03	
S-R-117-C	02GO-15-A	SoftTiss	U234	+5.13E-04	+1.07E-04	Bq/g	02/22/05	12/17/04	22	99.3	08	+2.62E-05	
S-R-117-C	02GO-15-A	SoftTiss	U235	+2.36E-05	+2.02E-05	Bq/g	02/22/05	12/17/04	22	99.3	08	+2.45E-05	
S-R-117-C	02GO-15-A	SoftTiss	U238	+4.17E-04	+9.90E-05	Bq/g	02/22/05	12/17/04	22	99.3	08	+1.94E-05	
S-R-117-C	02GO-15-A	SoftTiss	PU238	+2.87E-06	+1.18E-05	Bq/g	02/22/05	12/17/04	22	88.5	15	+8.67E-06	
S-R-117-C	02GO-15-A	SoftTiss	PU239/240	+3.42E-05	+1.71E-05	Bq/g	02/22/05	12/17/04	22	88.5	15	+1.97E-05	
S-R-117-C	02GO-15-A	SoftTiss	AM241	+2.17E-05	+2.25E-05	Bq/g	02/21/05	12/17/04	22	92.9	15	+1.89E-05	
S-R-117-C	02GO-15-A	SoftTiss	U236	+1.67E-06	+2.76E-06	Bq/g	02/22/05	12/17/04	22	99.3	08	+2.32E-05	
S-R-119-C	02GO-16-A	SoftTiss	SR90	+4.28E-04	+3.84E-04	Bq/g	02/16/05	12/17/04	22	83.4	B1	+1.57E-03	
S-R-119-C	02GO-16-A	SoftTiss	U234	+4.57E-04	+1.00E-04	Bq/g	02/22/05	12/17/04	22	99.0	05	+2.34E-05	
S-R-119-C	02GO-16-A	SoftTiss	U235	+2.04E-05	+1.92E-05	Bq/g	02/22/05	12/17/04	22	99.0	05	+1.29E-05	
S-R-119-C	02GO-16-A	SoftTiss	U238	+4.40E-04	+1.03E-04	Bq/g	02/22/05	12/17/04	22	99.0	05	+3.11E-05	
S-R-119-C	02GO-16-A	SoftTiss	PU238	-1.71E-06	+1.25E-05	Bq/g	02/22/05	12/17/04	22	86.1	16	+2.14E-05	
S-R-119-C	02GO-16-A	SoftTiss	PU239/240	+3.40E-05	+1.76E-05	Bq/g	02/22/05	12/17/04	22	86.1	16	+2.14E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF3

Case No: NA  
SDG No.: K-AA-105-C

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uner +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
S-R-119-C	02GO-16-A	SoftTiss	AM241	+3.09E-05	+2.38E-05	Bq/g	02/21/05	12/17/04	22	96.0	16	+2.17E-05	
S-R-119-C	02GO-16-A	SoftTiss	U236	+1.14E-05	+7.94E-06	Bq/g	02/22/05	12/17/04	22	99.0	05	+1.03E-05	
S-R-121-C	02GO-17-A	SoftTiss	SR90	+2.33E-04	+3.37E-04	Bq/g	02/16/05	12/17/04	22	92.9	B2	+1.40E-03	
S-R-121-C	02GO-17-A	SoftTiss	U234	+5.05E-04	+1.06E-04	Bq/g	02/22/05	12/17/04	22	101.9	06	+3.21E-05	
S-R-121-C	02GO-17-A	SoftTiss	U235	-6.21E-06	+1.29E-05	Bq/g	02/22/05	12/17/04	22	101.9	06	+2.87E-05	
S-R-121-C	02GO-17-A	SoftTiss	U238	+4.47E-04	+1.03E-04	Bq/g	02/22/05	12/17/04	22	101.9	06	+3.21E-05	
S-R-121-C	02GO-17-A	SoftTiss	PU238	-3.38E-06	+1.11E-05	Bq/g	02/21/05	12/17/04	22	88.1	09	+9.05E-06	
S-R-121-C	02GO-17-A	SoftTiss	PU239/240	+1.92E-05	+1.45E-05	Bq/g	02/21/05	12/17/04	22	88.1	09	+2.06E-05	
S-R-121-C	02GO-17-A	SoftTiss	AM241	+1.75E-05	+2.20E-05	Bq/g	02/21/05	12/17/04	22	99.0	10	+1.82E-05	
S-R-121-C	02GO-17-A	SoftTiss	U236	+2.66E-06	+4.26E-06	Bq/g	02/22/05	12/17/04	22	101.9	06	+1.90E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF3SDG No.: K-AA-105-C

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	-4.80E-03	-7.64E-03	NA	NA	Bq/spl	NA%	02/16/2005	90.8%	B4	+3.17E-02	
REAGENT	BLK	U234	+1.50E-03	+5.27E-04	NA	NA	Bq/spl	NA%	02/21/2005	100.6%	01	+6.39E-04	
REAGENT	BLK	U235	+1.82E-04	+2.74E-04	NA	NA	Bq/spl	NA%	02/21/2005	100.6%	01	+5.46E-04	
REAGENT	BLK	U238	+1.15E-03	+4.51E-04	NA	NA	Bq/spl	NA%	02/21/2005	100.6%	01	+4.33E-04	
REAGENT	BLK	PU238	+1.48E-04	+2.20E-04	NA	NA	Bq/spl	NA%	02/21/2005	98.4%	01	+4.43E-04	
REAGENT	BLK	PU239/240	+1.24E-04	+1.88E-04	NA	NA	Bq/spl	NA%	02/21/2005	98.4%	01	+5.31E-04	
REAGENT	BLK	AM241	+2.93E-04	+4.08E-04	NA	NA	Bq/spl	NA%	02/21/2005	95.5%	02	+5.25E-04	
REAGENT	BLK	U236	-9.33E-06	-1.51E-05	NA	NA	Bq/spl	NA%	02/21/2005	100.6%	01	+6.39E-04	
REAGENT	LCS	SR90	+6.88E+00	+3.16E-01	+7.10E+00	NA	Bq/mL	96.8%	02/16/2005	91.9%	B3	+6.24E-02	
REAGENT	LCS	U238	+2.03E-01	+3.00E-02	+1.99E-01	NA	Bq/mL	101.6%	02/22/2005	90.0%	08	+1.13E-03	
REAGENT	LCS	PU239/240	+1.58E-01	+1.89E-02	+1.50E-01	NA	Bq/mL	105.3%	02/21/2005	83.3%	08	+1.72E-03	
REAGENT	LCS	AM241	+1.47E-01	+1.36E-02	+1.55E-01	NA	Bq/mL	94.8%	02/21/2005	104.0%	05	+1.54E-03	

See Key for Form II.

Comments:

Project: Alpha and Sr-90 Analysis for Amchitka Island (Batch 3)

Laboratory: RTC

Report #: AmchitBatchF3

SDG#: K-AA-105-C

### Summary of 2 and 3 sigma activities

Below are the results for Sr90, U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 3 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-AA-105-C	02GO-05-A	U234	6.55E-04	1.57E-04	4.2
K-AA-105-C	02GO-05-A	U238	6.17E-04	1.58E-04	3.9
K-AA-106-C	02GO-06-A	U234	8.10E-04	1.73E-04	4.7
K-AA-106-C	02GO-06-A	U238	7.30E-04	1.70E-04	4.3
K-AA-111-C	02GO-11-A	U234	1.31E-03	2.47E-04	5.3
K-AA-111-C	02GO-11-A	U238	1.19E-03	2.47E-04	4.8
K-AA-112-C	02GO-12-A	U234	7.34E-04	1.66E-04	4.4
K-AA-112-C	02GO-12-A	U238	5.51E-04	1.46E-04	3.8
K-BB-107-C	02GO-07-A	U234	2.20E-04	9.51E-05	2.3
K-BB-107-C	02GO-07-A	U238	1.92E-04	8.72E-05	2.2
K-BB-108-C	02GO-08-A	U234	2.91E-04	1.04E-04	2.8
K-BB-108-C	02GO-08-A	U238	3.96E-04	1.20E-04	3.3
K-BB-109-C	02GO-09-A	PU239/240	2.07E-04	5.85E-05	3.5
K-BB-109-C	02GO-09-A	U234	7.03E-04	1.62E-04	4.3
K-BB-109-C	02GO-09-A	U238	7.47E-04	1.77E-04	4.2
K-BB-110-C	02GO-10-A	U234	6.87E-04	1.65E-04	4.2
K-BB-110-C	02GO-10-A	U238	7.98E-04	1.89E-04	4.2
K-CC-113-C	02GO-13-A	U234	3.46E-03	5.04E-04	6.9
K-CC-113-C	02GO-13-A	U235	1.74E-04	6.16E-05	2.8
K-CC-113-C	02GO-13-A	U238	3.03E-03	5.01E-04	6.0
K-CC-114-C	02GO-14-A	U234	2.06E-03	3.35E-04	6.1
K-CC-114-C	02GO-14-A	U235	9.59E-05	4.79E-05	2.0
K-CC-114-C	02GO-14-A	U238	1.91E-03	3.46E-04	5.5

# Alpha and Sr-90 Analysis for Amchitka Island (Batch 3)

## Summary of 2 and 3 sigma activities

Page 2

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-CC-115-C	02GO-01-A	U234	4.35E-03	6.06E-04	7.2
K-CC-115-C	02GO-01-A	U235	2.27E-04	7.14E-05	3.2
K-CC-115-C	02GO-01-A	U238	3.57E-03	5.73E-04	6.2
K-CC-130-C	02GO-02-A	U234	2.29E-03	3.68E-04	6.2
K-CC-130-C	02GO-02-A	U235	1.16E-04	5.35E-05	2.2
K-CC-130-C	02GO-02-A	U238	2.11E-03	3.78E-04	5.6
K-CC-132-C	02GO-03-A	AM241	7.80E-03	6.34E-04	12.3
K-CC-132-C	02GO-03-A	PU238	5.16E-03	5.85E-04	8.8
K-CC-132-C	02GO-03-A	SR90	3.41E-02	1.70E-03	20.1
K-CC-132-C	02GO-03-A	U234	8.18E-04	1.81E-04	4.5
K-CC-132-C	02GO-03-A	U238	7.39E-04	1.77E-04	4.2
K-CC-133-C	02GO-04-A	AM241	2.33E-03	2.56E-04	9.1
K-CC-133-C	02GO-04-A	PU239/240	3.35E-03	4.10E-04	8.2
K-CC-133-C	02GO-04-A	SR90	9.13E-03	7.21E-04	12.7
K-CC-133-C	02GO-04-A	U234	8.90E-04	1.90E-04	4.7
K-CC-133-C	02GO-04-A	U238	7.41E-04	1.77E-04	4.2
S-R-117-C	02GO-15-A	PU239/240	3.42E-05	1.71E-05	2.0
S-R-117-C	02GO-15-A	U234	5.13E-04	1.07E-04	4.8
S-R-117-C	02GO-15-A	U238	4.17E-04	9.90E-05	4.2
S-R-119-C	02GO-16-A	U234	4.57E-04	1.00E-04	4.6
S-R-119-C	02GO-16-A	U238	4.40E-04	1.03E-04	4.3
S-R-121-C	02GO-17-A	U234	5.05E-04	1.06E-04	4.8
S-R-121-C	02GO-17-A	U238	4.47E-04	1.03E-04	4.3

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).



**BATCH 4**  
**ALPHA AND Sr-90**

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Alpha and Sr-90 Analysis for Amchitka Island (Batch 4)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF4 Method Type: A/B

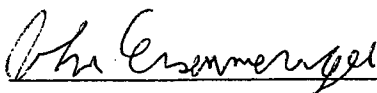
Approved SAP No.: NA SDG No.: B-L-150-B

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>B-K-152-B</u>	<u>02IK-17-A</u>
<u>B-L-150-B</u>	<u>02IK-01-A</u>
<u>B-L-151-B</u>	<u>02IK-16-A</u>
<u>B-M-138-B</u>	<u>02IK-12-A</u>
<u>B-M-139-B</u>	<u>02IK-10-A</u>
<u>B-M-140-B</u>	<u>02IK-06-A</u>
<u>B-M-141-B</u>	<u>02IK-11-A</u>
<u>B-M-142-B</u>	<u>02IK-03-A</u>
<u>B-M-143-B</u>	<u>02IK-15-A</u>
<u>B-M-144-B</u>	<u>02IK-14-A</u>
<u>B-M-145-B</u>	<u>02IK-13-A</u>
<u>B-O-146-B</u>	<u>02IK-07-A</u>
<u>B-O-147-B</u>	<u>02IK-08-A</u>
<u>B-O-148-B</u>	<u>02IK-05-A</u>
<u>B-P-135-B</u>	<u>02IK-04-A</u>
<u>B-P-136-B</u>	<u>02IK-09-A</u>
<u>B-P-137-B</u>	<u>02IK-02-A</u>

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF4

Case No: NA  
SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-152-B	02IK-17-A	Bone	SR90	+2.73E-02	+4.34E-03	Bq/g	03/23/05	01/18/05	2.19	85.7	B3	+1.60E-02	
B-K-152-B	02IK-17-A	Bone	U234	-2.13E-04	+3.97E-04	Bq/g	04/03/05	01/18/05	2.19	103.6	06	+2.53E-04	
B-K-152-B	02IK-17-A	Bone	U235	-5.92E-05	+1.66E-04	Bq/g	04/03/05	01/18/05	2.19	103.6	06	+3.49E-04	
B-K-152-B	02IK-17-A	Bone	U238	+1.20E-04	+3.56E-04	Bq/g	04/03/05	01/18/05	2.19	103.6	06	+2.53E-04	
B-K-152-B	02IK-17-A	Bone	PU238	+4.18E-02	+4.73E-03	Bq/g	04/03/05	01/18/05	2.19	93.5	04	+2.50E-04	
B-K-152-B	02IK-17-A	Bone	PU239/240	+4.65E-02	+5.22E-03	Bq/g	04/03/05	01/18/05	2.19	93.5	04	+3.32E-04	
B-K-152-B	02IK-17-A	Bone	AM241	+2.44E-02	+2.27E-03	Bq/g	04/03/05	01/18/05	2.19	108.8	03	+2.63E-04	
B-K-152-B	02IK-17-A	Bone	U236	+2.63E-05	+5.65E-05	Bq/g	04/03/05	01/18/05	2.19	103.6	06	+1.88E-04	
B-L-150-B	02IK-01-A	Bone	SR90	+2.27E-04	+5.61E-04	Bq/g	03/22/05	01/18/05	15	70.4	A1	+2.28E-03	
B-L-150-B	02IK-01-A	Bone	U234	+5.67E-04	+1.36E-04	Bq/g	03/15/05	01/18/05	15	98.5	03	+3.68E-05	
B-L-150-B	02IK-01-A	Bone	U235	+9.10E-06	+4.09E-05	Bq/g	03/15/05	01/18/05	15	98.5	03	+4.64E-05	
B-L-150-B	02IK-01-A	Bone	U238	+4.71E-04	+1.22E-04	Bq/g	03/15/05	01/18/05	15	98.5	03	+3.68E-05	
B-L-150-B	02IK-01-A	Bone	PU238	+9.33E-07	+2.05E-05	Bq/g	03/15/05	01/18/05	15	79.9	09	+1.46E-05	
B-L-150-B	02IK-01-A	Bone	PU239/240	+6.44E-06	+2.44E-05	Bq/g	03/15/05	01/18/05	15	79.9	09	+2.79E-05	
B-L-150-B	02IK-01-A	Bone	AM241	+9.40E-06	+3.00E-05	Bq/g	03/30/05	01/18/05	15	104.9	09	+1.12E-05	
B-L-150-B	02IK-01-A	Bone	U236	+1.31E-05	+2.00E-05	Bq/g	03/15/05	01/18/05	15	98.5	03	+2.49E-05	
B-L-151-B	02IK-16-A	Bone	SR90	-8.57E-05	+7.84E-04	Bq/g	03/23/05	01/18/05	15	60.0	B2	+3.23E-03	
B-L-151-B	02IK-16-A	Bone	U234	+4.83E-04	+1.27E-04	Bq/g	04/03/05	01/18/05	15	104.8	05	+3.66E-05	
B-L-151-B	02IK-16-A	Bone	U235	+3.28E-05	+3.31E-05	Bq/g	04/03/05	01/18/05	15	104.8	05	+4.60E-05	
B-L-151-B	02IK-16-A	Bone	U238	+6.07E-04	+1.46E-04	Bq/g	04/03/05	01/18/05	15	104.8	05	+5.29E-05	
B-L-151-B	02IK-16-A	Bone	PU238	-7.55E-06	+1.51E-05	Bq/g	03/15/05	01/18/05	15	84.1	16	+3.21E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-L-151-B	02IK-16-A	Bone	PU239/240	+1.95E-05	+4.06E-05	Bq/g	03/15/05	01/18/05	15	84.1	16	+4.54E-05	
B-L-151-B	02IK-16-A	Bone	AM241	-8.92E-06	+3.12E-05	Bq/g	03/31/05	01/18/05	15	101.3	16	+2.68E-05	
B-L-151-B	02IK-16-A	Bone	U236	+2.33E-05	+3.27E-05	Bq/g	04/03/05	01/18/05	15	104.8	05	+3.25E-05	
B-M-138-B	02IK-12-A	Bone	SR90	+2.45E-03	+4.07E-03	Bq/g	03/23/05	01/18/05	2.5	81.2	B1	+1.51E-02	
B-M-138-B	02IK-12-A	Bone	U234	-4.05E-04	+3.20E-04	Bq/g	03/30/05	01/18/05	2.5	108.0	04	+2.34E-04	
B-M-138-B	02IK-12-A	Bone	U235	-6.39E-05	+1.39E-04	Bq/g	03/30/05	01/18/05	2.5	108.0	04	+3.17E-04	
B-M-138-B	02IK-12-A	Bone	U238	+1.92E-04	+3.20E-04	Bq/g	03/30/05	01/18/05	2.5	108.0	04	+1.58E-04	
B-M-138-B	02IK-12-A	Bone	PU238	-6.24E-05	+8.82E-05	Bq/g	03/15/05	01/18/05	2.5	90.1	12	+2.22E-04	
B-M-138-B	02IK-12-A	Bone	PU239/240	-7.49E-06	+9.89E-05	Bq/g	03/15/05	01/18/05	2.5	90.1	12	+1.80E-04	
B-M-138-B	02IK-12-A	Bone	AM241	-6.15E-05	+1.83E-04	Bq/g	03/31/05	01/18/05	2.5	110.8	12	+2.08E-04	
B-M-138-B	02IK-12-A	Bone	U236	-3.42E-06	+3.40E-05	Bq/g	03/30/05	01/18/05	2.5	108.0	04	+2.34E-04	
B-M-139-B	02IK-10-A	Bone	SR90	+8.81E-03	+3.54E-03	Bq/g	03/23/05	01/18/05	2.5	83.3	A3	+1.38E-02	
B-M-139-B	02IK-10-A	Bone	U234	-5.27E-04	+3.13E-04	Bq/g	03/15/05	01/18/05	2.5	98.6	08	+3.07E-04	
B-M-139-B	02IK-10-A	Bone	U235	-1.22E-04	+1.46E-04	Bq/g	03/15/05	01/18/05	2.5	98.6	08	+2.92E-04	
B-M-139-B	02IK-10-A	Bone	U238	+4.10E-05	+3.09E-04	Bq/g	03/15/05	01/18/05	2.5	98.6	08	+2.91E-04	
B-M-139-B	02IK-10-A	Bone	PU238	+2.14E-06	+1.20E-04	Bq/g	03/15/05	01/18/05	2.5	83.4	10	+8.31E-05	
B-M-139-B	02IK-10-A	Bone	PU239/240	-2.58E-05	+8.41E-05	Bq/g	03/15/05	01/18/05	2.5	83.4	10	+2.96E-04	
B-M-139-B	02IK-10-A	Bone	AM241	+1.28E-05	+1.76E-04	Bq/g	03/31/05	01/18/05	2.5	98.9	10	+7.05E-05	
B-M-139-B	02IK-10-A	Bone	U236	-1.85E-05	+4.53E-05	Bq/g	03/15/05	01/18/05	2.5	98.6	08	+2.06E-04	
B-M-140-B	02IK-06-A	Bone	SR90	+3.06E-03	+3.26E-03	Bq/g	03/22/05	01/18/05	2.5	70.9	B2	+1.33E-02	
B-M-140-B	02IK-06-A	Bone	U234	-7.29E-06	+3.63E-04	Bq/g	03/15/05	01/18/05	2.5	103.3	03	+2.11E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-M-140-B	02IK-06-A	Bone	U235	-1.07E-04	+1.38E-04	Bq/g	03/15/05	01/18/05	2.5	103.3	03	+2.15E-04	
B-M-140-B	02IK-06-A	Bone	U238	+1.23E-04	+3.07E-04	Bq/g	03/15/05	01/18/05	2.5	103.3	03	+2.11E-04	
B-M-140-B	02IK-06-A	Bone	PU238	-1.76E-05	+1.08E-04	Bq/g	03/15/05	01/18/05	2.5	87.6	14	+1.77E-04	
B-M-140-B	02IK-06-A	Bone	PU239/240	-8.06E-06	+9.83E-05	Bq/g	03/15/05	01/18/05	2.5	87.6	14	+1.77E-04	
B-M-140-B	02IK-06-A	Bone	AM241	-2.42E-06	+2.23E-04	Bq/g	03/31/05	01/18/05	2.5	98.1	14	+1.59E-04	
B-M-140-B	02IK-06-A	Bone	U236	+2.00E-05	+4.60E-05	Bq/g	03/15/05	01/18/05	2.5	103.3	03	+1.43E-04	
B-M-141-B	02IK-11-A	Bone	SR90	-4.70E-04	+3.59E-03	Bq/g	03/23/05	01/18/05	2.5	82.7	A4	+1.43E-02	
B-M-141-B	02IK-11-A	Bone	U234	+1.40E-04	+3.79E-04	Bq/g	03/30/05	01/18/05	2.5	103.9	03	+1.70E-04	
B-M-141-B	02IK-11-A	Bone	U235	-4.71E-05	+1.48E-04	Bq/g	03/30/05	01/18/05	2.5	103.9	03	+2.41E-04	
B-M-141-B	02IK-11-A	Bone	U238	+4.49E-04	+3.56E-04	Bq/g	03/30/05	01/18/05	2.5	103.9	03	+2.09E-04	
B-M-141-B	02IK-11-A	Bone	PU238	-2.65E-05	+1.01E-04	Bq/g	03/15/05	01/18/05	2.5	92.7	11	+1.94E-04	
B-M-141-B	02IK-11-A	Bone	PU239/240	-2.47E-05	+8.47E-05	Bq/g	03/15/05	01/18/05	2.5	92.7	11	+2.13E-04	
B-M-141-B	02IK-11-A	Bone	AM241	-1.13E-04	+1.63E-04	Bq/g	03/31/05	01/18/05	2.5	110.9	11	+1.63E-04	
B-M-141-B	02IK-11-A	Bone	U236	+1.98E-05	+4.59E-05	Bq/g	03/30/05	01/18/05	2.5	103.9	03	+1.42E-04	
B-M-142-B	02IK-03-A	Bone	SR90	+5.34E-03	+2.71E-03	Bq/g	03/22/05	01/18/05	2.5	87.5	A3	+1.09E-02	
B-M-142-B	02IK-03-A	Bone	U234	-4.76E-04	+3.08E-04	Bq/g	03/15/05	01/18/05	2.5	108.7	05	+1.57E-04	
B-M-142-B	02IK-03-A	Bone	U235	-5.99E-05	+1.41E-04	Bq/g	03/15/05	01/18/05	2.5	108.7	05	+1.98E-04	
B-M-142-B	02IK-03-A	Bone	U238	-1.49E-04	+2.76E-04	Bq/g	03/15/05	01/18/05	2.5	108.7	05	+2.93E-04	
B-M-142-B	02IK-03-A	Bone	PU238	+1.76E-06	+1.26E-04	Bq/g	03/15/05	01/18/05	2.5	92.4	11	+1.95E-04	
B-M-142-B	02IK-03-A	Bone	PU239/240	-1.68E-05	+9.07E-05	Bq/g	03/15/05	01/18/05	2.5	92.4	11	+1.95E-04	
B-M-142-B	02IK-03-A	Bone	AM241	-1.13E-04	+1.63E-04	Bq/g	03/30/05	01/18/05	2.5	105.3	11	+1.72E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-M-142-B	02IK-03-A	Bone	U236	-3.38E-06	+3.40E-05	Bq/g	03/15/05	01/18/05	2.5	108.7	05	+2.31E-04	
B-M-143-B	02IK-15-A	Bone	SR90	+3.39E-03	+3.59E-03	Bq/g	03/23/05	01/18/05	2.5	80.3	B1	+1.46E-02	
B-M-143-B	02IK-15-A	Bone	U234	-2.19E-04	+3.54E-04	Bq/g	03/30/05	01/18/05	2.5	93.8	08	+3.06E-04	
B-M-143-B	02IK-15-A	Bone	U235	-3.60E-05	+1.56E-04	Bq/g	03/30/05	01/18/05	2.5	93.8	08	+3.07E-04	
B-M-143-B	02IK-15-A	Bone	U238	+2.56E-04	+3.46E-04	Bq/g	03/30/05	01/18/05	2.5	93.8	08	+2.87E-04	
B-M-143-B	02IK-15-A	Bone	PU238	-4.04E-05	+9.27E-05	Bq/g	03/15/05	01/18/05	2.5	95.9	15	+1.34E-04	
B-M-143-B	02IK-15-A	Bone	PU239/240	-3.81E-05	+7.75E-05	Bq/g	03/15/05	01/18/05	2.5	95.9	15	+1.60E-04	
B-M-143-B	02IK-15-A	Bone	AM241	-2.61E-05	+2.02E-04	Bq/g	03/31/05	01/18/05	2.5	102.4	15	+1.26E-04	
B-M-143-B	02IK-15-A	Bone	U236	-1.95E-05	+4.63E-05	Bq/g	03/30/05	01/18/05	2.5	93.8	08	+2.17E-04	
B-M-144-B	02IK-14-A	Bone	SR90	+2.63E-03	+3.69E-03	Bq/g	03/23/05	01/18/05	2.5	79.6	B3	+1.43E-02	
B-M-144-B	02IK-14-A	Bone	U234	-1.87E-04	+3.42E-04	Bq/g	03/30/05	01/18/05	2.5	117.0	06	+2.15E-04	
B-M-144-B	02IK-14-A	Bone	U235	-1.27E-04	+1.49E-04	Bq/g	03/30/05	01/18/05	2.5	117.0	06	+2.71E-04	
B-M-144-B	02IK-14-A	Bone	U238	+1.45E-04	+3.10E-04	Bq/g	03/30/05	01/18/05	2.5	117.0	06	+1.96E-04	
B-M-144-B	02IK-14-A	Bone	PU238	+6.21E-06	+1.30E-04	Bq/g	03/15/05	01/18/05	2.5	94.2	14	+1.65E-04	
B-M-144-B	02IK-14-A	Bone	PU239/240	-3.77E-05	+7.77E-05	Bq/g	03/15/05	01/18/05	2.5	94.2	14	+1.65E-04	
B-M-144-B	02IK-14-A	Bone	AM241	+8.35E-05	+1.84E-04	Bq/g	03/31/05	01/18/05	2.5	106.6	14	+1.46E-04	
B-M-144-B	02IK-14-A	Bone	U236	+6.91E-05	+1.09E-04	Bq/g	03/30/05	01/18/05	2.5	117.0	06	+1.74E-04	
B-M-145-B	02IK-13-A	Bone	SR90	+1.56E-03	+3.72E-03	Bq/g	03/23/05	01/18/05	2.5	85.4	B2	+1.40E-02	
B-M-145-B	02IK-13-A	Bone	U234	-5.35E-04	+3.02E-04	Bq/g	03/30/05	01/18/05	2.5	108.1	05	+1.58E-04	
B-M-145-B	02IK-13-A	Bone	U235	-2.12E-05	+1.67E-04	Bq/g	03/30/05	01/18/05	2.5	108.1	05	+1.99E-04	
B-M-145-B	02IK-13-A	Bone	U238	-3.83E-04	+3.12E-04	Bq/g	03/30/05	01/18/05	2.5	108.1	05	+2.81E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-M-145-B	02IK-13-A	Bone	PU238	-7.47E-05	+9.15E-05	Bq/g	03/15/05	01/18/05	2.5	91.0	13	+1.73E-04	
B-M-145-B	02IK-13-A	Bone	PU239/240	-8.39E-05	+9.34E-05	Bq/g	03/15/05	01/18/05	2.5	91.0	13	+2.70E-04	
B-M-145-B	02IK-13-A	Bone	AM241	-4.93E-05	+1.89E-04	Bq/g	03/31/05	01/18/05	2.5	102.8	13	+1.28E-04	
B-M-145-B	02IK-13-A	Bone	U236	-3.40E-05	+6.54E-05	Bq/g	03/30/05	01/18/05	2.5	108.1	05	+2.33E-04	
B-O-146-B	02IK-07-A	Bone	SR90	+4.34E-03	+4.74E-03	Bq/g	03/22/05	01/18/05	1.5	86.8	B3	+1.89E-02	
B-O-146-B	02IK-07-A	Bone	U234	-4.91E-04	+5.52E-04	Bq/g	03/15/05	01/18/05	1.5	107.9	04	+3.17E-04	
B-O-146-B	02IK-07-A	Bone	U235	-1.71E-04	+2.27E-04	Bq/g	03/15/05	01/18/05	1.5	107.9	04	+5.30E-04	
B-O-146-B	02IK-07-A	Bone	U238	+4.24E-04	+5.52E-04	Bq/g	03/15/05	01/18/05	1.5	107.9	04	+2.65E-04	
B-O-146-B	02IK-07-A	Bone	PU238	+2.28E-05	+2.26E-04	Bq/g	03/15/05	01/18/05	1.5	93.1	15	+2.30E-04	
B-O-146-B	02IK-07-A	Bone	PU239/240	-1.82E-05	+1.59E-04	Bq/g	03/15/05	01/18/05	1.5	93.1	15	+2.76E-04	
B-O-146-B	02IK-07-A	Bone	AM241	-8.58E-05	+3.12E-04	Bq/g	03/31/05	01/18/05	1.5	103.8	15	+2.07E-04	
B-O-146-B	02IK-07-A	Bone	U236	+2.28E-05	+6.67E-05	Bq/g	03/15/05	01/18/05	1.5	107.9	04	+3.17E-04	
B-O-147-B	02IK-08-A	Bone	SR90	-2.72E-03	+5.72E-03	Bq/g	03/23/05	01/18/05	1.5	92.6	A1	+2.23E-02	
B-O-147-B	02IK-08-A	Bone	U234	-2.69E-04	+5.86E-04	Bq/g	03/15/05	01/18/05	1.5	101.1	05	+3.37E-04	
B-O-147-B	02IK-08-A	Bone	U235	-2.76E-05	+2.86E-04	Bq/g	03/15/05	01/18/05	1.5	101.1	05	+3.54E-04	
B-O-147-B	02IK-08-A	Bone	U238	-3.09E-04	+4.58E-04	Bq/g	03/15/05	01/18/05	1.5	101.1	05	+5.26E-04	
B-O-147-B	02IK-08-A	Bone	PU238	-7.75E-05	+1.50E-04	Bq/g	03/15/05	01/18/05	1.5	92.0	16	+2.93E-04	
B-O-147-B	02IK-08-A	Bone	PU239/240	-1.14E-04	+1.35E-04	Bq/g	03/15/05	01/18/05	1.5	92.0	16	+4.15E-04	
B-O-147-B	02IK-08-A	Bone	AM241	-5.52E-05	+3.38E-04	Bq/g	03/31/05	01/18/05	1.5	99.4	16	+3.08E-04	
B-O-147-B	02IK-08-A	Bone	U236	-4.54E-05	+9.34E-05	Bq/g	03/15/05	01/18/05	1.5	101.1	05	+3.79E-04	
B-O-148-B	02IK-05-A	Bone	SR90	+2.71E-03	+4.88E-03	Bq/g	03/22/05	01/18/05	1.5	79.5	B1	+2.00E-02	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-O-148-B	02IK-05-A	Bone	U234	-9.03E-05	+6.18E-04	Bq/g	03/15/05	01/18/05	1.5	102.0	08	+4.95E-04	
B-O-148-B	02IK-05-A	Bone	U235	-6.69E-05	+2.55E-04	Bq/g	03/15/05	01/18/05	1.5	102.0	08	+4.71E-04	
B-O-148-B	02IK-05-A	Bone	U238	-5.66E-05	+4.89E-04	Bq/g	03/15/05	01/18/05	1.5	102.0	08	+4.41E-04	
B-O-148-B	02IK-05-A	Bone	PU238	-1.65E-05	+1.91E-04	Bq/g	03/15/05	01/18/05	1.5	89.0	13	+2.46E-04	
B-O-148-B	02IK-05-A	Bone	PU239/240	-1.27E-04	+1.45E-04	Bq/g	03/15/05	01/18/05	1.5	89.0	13	+4.39E-04	
B-O-148-B	02IK-05-A	Bone	AM241	+3.62E-05	+2.95E-04	Bq/g	03/31/05	01/18/05	1.5	105.5	13	+2.09E-04	
B-O-148-B	02IK-05-A	Bone	U236	-2.99E-05	+7.43E-05	Bq/g	03/15/05	01/18/05	1.5	102.0	08	+3.32E-04	
B-P-135-B	02IK-04-A	Bone	SR90	+8.36E-05	+4.68E-03	Bq/g	03/22/05	01/18/05	1.5	83.2	A4	+1.92E-02	
B-P-135-B	02IK-04-A	Bone	U234	-5.95E-04	+5.46E-04	Bq/g	03/15/05	01/18/05	1.5	103.8	06	+4.04E-04	
B-P-135-B	02IK-04-A	Bone	U235	-1.16E-04	+2.29E-04	Bq/g	03/15/05	01/18/05	1.5	103.8	06	+4.13E-04	
B-P-135-B	02IK-04-A	Bone	U238	+1.35E-04	+5.11E-04	Bq/g	03/15/05	01/18/05	1.5	103.8	06	+3.28E-04	
B-P-135-B	02IK-04-A	Bone	PU238	-9.08E-05	+1.47E-04	Bq/g	03/15/05	01/18/05	1.5	93.7	12	+3.25E-04	
B-P-135-B	02IK-04-A	Bone	PU239/240	+3.12E-04	+2.15E-04	Bq/g	03/15/05	01/18/05	1.5	93.7	12	+2.89E-04	
B-P-135-B	02IK-04-A	Bone	AM241	+4.19E-05	+4.24E-04	Bq/g	03/31/05	01/18/05	1.5	99.0	12	+3.88E-04	
B-P-135-B	02IK-04-A	Bone	U236	+3.83E-05	+8.24E-05	Bq/g	03/15/05	01/18/05	1.5	103.8	06	+2.74E-04	
B-P-136-B	02IK-09-A	Bone	SR90	+1.38E-03	+5.18E-03	Bq/g	03/23/05	01/18/05	1.5	87.9	A2	+2.11E-02	
B-P-136-B	02IK-09-A	Bone	U234	-5.46E-04	+5.43E-04	Bq/g	03/30/05	01/18/05	1.5	116.6	06	+3.60E-04	
B-P-136-B	02IK-09-A	Bone	U235	-1.52E-04	+2.24E-04	Bq/g	03/30/05	01/18/05	1.5	116.6	06	+4.53E-04	
B-P-136-B	02IK-09-A	Bone	U238	+1.50E-04	+5.03E-04	Bq/g	03/30/05	01/18/05	1.5	116.6	06	+3.28E-04	
B-P-136-B	02IK-09-A	Bone	PU238	-4.56E-05	+1.66E-04	Bq/g	03/30/05	01/18/05	1.5	81.5	09	+1.43E-04	
B-P-136-B	02IK-09-A	Bone	PU239/240	+8.53E-06	+1.84E-04	Bq/g	03/30/05	01/18/05	1.5	81.5	09	+2.73E-04	

See Key for Form I.

Comments:



## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF4

Case No: NA  
SDG No.: B-L-150-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-P-136-B	02IK-09-A	Bone	AM241	-2.40E-05	+2.88E-04	Bq/g	03/31/05	01/18/05	1.5	101.3	09	+1.16E-04	
B-P-136-B	02IK-09-A	Bone	U236	+3.41E-05	+7.76E-05	Bq/g	03/30/05	01/18/05	1.5	116.6	06	+2.44E-04	
B-P-137-B	02IK-02-A	Bone	SR90	-3.59E-03	+5.01E-03	Bq/g	03/22/05	01/18/05	1.5	77.5	A2	+2.06E-02	
B-P-137-B	02IK-02-A	Bone	U234	-4.62E-04	+5.81E-04	Bq/g	03/15/05	01/18/05	1.5	88.6	04	+5.12E-04	
B-P-137-B	02IK-02-A	Bone	U235	-4.09E-05	+2.78E-04	Bq/g	03/15/05	01/18/05	1.5	88.6	04	+6.87E-04	
B-P-137-B	02IK-02-A	Bone	U238	+1.49E-04	+5.28E-04	Bq/g	03/15/05	01/18/05	1.5	88.6	04	+3.23E-04	
B-P-137-B	02IK-02-A	Bone	PU238	+1.21E-04	+1.94E-04	Bq/g	03/15/05	01/18/05	1.5	77.7	10	+1.48E-04	
B-P-137-B	02IK-02-A	Bone	PU239/240	+1.49E-05	+1.95E-04	Bq/g	03/15/05	01/18/05	1.5	77.7	10	+5.30E-04	
B-P-137-B	02IK-02-A	Bone	AM241	-2.21E-04	+2.75E-04	Bq/g	03/30/05	01/18/05	1.5	90.5	10	+2.92E-04	
B-P-137-B	02IK-02-A	Bone	U236	-6.95E-05	+1.27E-04	Bq/g	03/15/05	01/18/05	1.5	88.6	04	+4.76E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF4SDG No.: B-L-150-B

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	+9.55E-03	+1.13E-02	NA	NA	Bq/sp1e	NA%	03/22/2005	50.0%	B4	+4.64E-02	
REAGENT	BLK	U234	+2.15E-03	+6.75E-04	NA	NA	Bq/sp1	NA%	04/03/2005	91.8%	01	+5.68E-04	
REAGENT	BLK	U235	+2.19E-04	+3.36E-04	NA	NA	Bq/sp1	NA%	04/03/2005	91.8%	01	+8.82E-04	
REAGENT	BLK	U238	+1.34E-03	+5.43E-04	NA	NA	Bq/sp1	NA%	04/03/2005	91.8%	01	+7.54E-04	
REAGENT	BLK	PU238	+1.48E-04	+2.20E-04	NA	NA	Bq/sp1	NA%	02/21/2005	98.4%	01	+4.43E-04	
REAGENT	BLK	PU239/240	+1.24E-04	+1.88E-04	NA	NA	Bq/sp1	NA%	02/21/2005	98.4%	01	+5.31E-04	
REAGENT	BLK	AM241	+2.93E-04	+4.08E-04	NA	NA	Bq/sp1	NA%	02/21/2005	95.5%	02	+5.25E-04	
REAGENT	BLK	U236	-5.11E-05	-8.39E-05	NA	NA	Bq/sp1	NA%	04/03/2005	91.8%	01	+5.68E-04	
REAGENT	LCS	SR90	+6.99E+00	+3.21E-01	+7.10E+00	NA	Bq/mL	98.4%	03/23/2005	60.1%	B4	+9.70E-02	
REAGENT	LCS	U238	+2.30E-01	+3.42E-02	+1.99E-01	NA	Bq/mL	115.1%	03/15/2005	82.5%	08	+1.63E-03	
REAGENT	LCS	PU239/240	+1.55E-01	+1.84E-02	+1.50E-01	NA	Bq/mL	103.3%	04/03/2005	85.4%	08	+2.16E-03	
REAGENT	LCS	AM241	+1.61E-01	+1.57E-02	+1.55E-01	NA	Bq/mL	103.8%	03/30/2005	86.9%	08	+2.38E-03	
REAGENT	BLK	SR90	+9.09E-03	+1.46E-02	NA	NA	Bq/sp1e	NA%	03/23/2005	50.0%	B4	+5.62E-02	
REAGENT	BLK	PU238	+1.62E-03	+5.44E-04	NA	NA	Bq/sp1	NA%	04/03/2005	63.7%	09	+2.75E-04	
REAGENT	BLK	PU239/240	+2.10E-03	+6.46E-04	NA	NA	Bq/sp1	NA%	04/03/2005	63.7%	09	+5.24E-04	
REAGENT	BLK	AM241	+1.97E-04	+2.61E-04	NA	NA	Bq/sp1	NA%	04/03/2005	65.1%	10	+2.68E-04	

See Key for Form II.

Comments:

Project: Alpha and Sr-90 Analysis for Amchitka Island (Batch 4)  
 Laboratory: RTC  
 Report #: AmchitBatchF4  
 SDG#: B-L-150-B

### Summary of 2 and 3 sigma activities

Below are the results for Sr90, U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 4 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
B-K-152-B	02IK-17-A	AM241	2.44E-02	2.27E-03	10.7
B-K-152-B	02IK-17-A	PU238	4.18E-02	4.73E-03	8.8
B-K-152-B	02IK-17-A	PU239/240	4.65E-02	5.22E-03	8.9
B-K-152-B	02IK-17-A	SR90	2.73E-02	4.34E-03	6.3
B-L-150-B	02IK-01-A	U234	5.67E-04	1.36E-04	4.2
B-L-150-B	02IK-01-A	U238	4.71E-04	1.22E-04	3.9
B-L-151-B	02IK-16-A	U234	4.83E-04	1.27E-04	3.8
B-L-151-B	02IK-16-A	U238	6.07E-04	1.46E-04	4.2
B-M-139-B	02IK-10-A	SR90	8.81E-03	3.54E-03	2.5
B-M-142-B	02IK-03-A	SR90	5.34E-03	2.71E-03	2.0

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 5**  
**ALPHA AND Sr-90**

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Alpha and Sr-90 Analysis for Amchitka Island (Batch 5)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF5 Method Type: A/B


Approved SAP No.: NA SDG No.: B-A-163-B

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>B-A-163-B</u>	<u>02JJ-03-A</u>
<u>B-B-154-B</u>	<u>02JJ-01-A</u>
<u>B-C-162-B</u>	<u>02JJ-02-A</u>
<u>B-C-174-B</u>	<u>02JJ-08-A</u>
<u>B-J-167-B</u>	<u>02JJ-05-A</u>
<u>B-K-171-B</u>	<u>02JJ-06-A</u>
<u>B-K-172-B</u>	<u>02JJ-07-A</u>
<u>B-L-164-B</u>	<u>02JJ-04-A</u>

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature: 

Title: Technical Leader

Name: J. G. Eisenmenger

Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF5SDG No.: B-A-163-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-A-163-B	02JJ-03-A	Bone	SR90	-2.27E-04	+4.77E-04	Bq/g	05/03/05	02/07/05	15	86.4	A3	+1.95E-03	
B-A-163-B	02JJ-03-A	Bone	U234	+9.63E-04	+1.74E-04	Bq/g	04/13/05	02/07/05	15	107.0	05	+4.97E-05	
B-A-163-B	02JJ-03-A	Bone	U235	+6.53E-05	+3.07E-05	Bq/g	04/13/05	02/07/05	15	107.0	05	+5.97E-05	
B-A-163-B	02JJ-03-A	Bone	U238	+9.40E-04	+1.78E-04	Bq/g	04/13/05	02/07/05	15	107.0	05	+4.49E-05	
B-A-163-B	02JJ-03-A	Bone	PU238	-9.68E-07	+5.74E-06	Bq/g	04/11/05	02/07/05	15	93.1	11	+2.87E-05	
B-A-163-B	02JJ-03-A	Bone	PU239/240	+3.68E-06	+1.12E-05	Bq/g	04/11/05	02/07/05	15	93.1	11	+2.87E-05	
B-A-163-B	02JJ-03-A	Bone	AM241	+2.50E-05	+2.56E-05	Bq/g	04/13/05	02/07/05	15	105.4	11	+2.55E-05	
B-A-163-B	02JJ-03-A	Bone	U236	+3.18E-06	+2.40E-05	Bq/g	04/13/05	02/07/05	15	107.0	05	+3.18E-05	
B-B-154-B	02JJ-01-A	Bone	SR90	-1.77E-04	+5.30E-04	Bq/g	05/03/05	02/07/05	15	78.1	A1	+2.16E-03	
B-B-154-B	02JJ-01-A	Bone	U234	+2.18E-03	+3.17E-04	Bq/g	04/11/05	02/07/05	15	104.5	03	+4.19E-05	
B-B-154-B	02JJ-01-A	Bone	U235	+1.16E-04	+4.04E-05	Bq/g	04/11/05	02/07/05	15	104.5	03	+6.01E-05	
B-B-154-B	02JJ-01-A	Bone	U238	+1.83E-03	+3.01E-04	Bq/g	04/11/05	02/07/05	15	104.5	03	+3.97E-05	
B-B-154-B	02JJ-01-A	Bone	PU238	+4.22E-06	+1.19E-05	Bq/g	04/11/05	02/07/05	15	85.8	09	+3.10E-05	
B-B-154-B	02JJ-01-A	Bone	PU239/240	+2.43E-05	+3.46E-05	Bq/g	04/11/05	02/07/05	15	85.8	09	+3.10E-05	
B-B-154-B	02JJ-01-A	Bone	AM241	+2.89E-05	+2.66E-05	Bq/g	04/13/05	02/07/05	15	95.4	09	+2.81E-05	
B-B-154-B	02JJ-01-A	Bone	U236	+4.80E-07	+2.11E-05	Bq/g	04/11/05	02/07/05	15	104.5	03	+3.17E-05	
B-C-162-B	02JJ-02-A	Bone	SR90	-3.91E-04	+4.72E-04	Bq/g	05/03/05	02/07/05	15	87.4	A2	+1.93E-03	
B-C-162-B	02JJ-02-A	Bone	U234	+8.57E-04	+1.57E-04	Bq/g	04/13/05	02/07/05	15	117.1	04	+4.12E-05	
B-C-162-B	02JJ-02-A	Bone	U235	+5.30E-05	+2.50E-05	Bq/g	04/13/05	02/07/05	15	117.1	04	+4.54E-05	
B-C-162-B	02JJ-02-A	Bone	U238	+7.79E-04	+1.50E-04	Bq/g	04/13/05	02/07/05	15	117.1	04	+3.87E-05	
B-C-162-B	02JJ-02-A	Bone	PU238	-7.36E-07	+5.95E-06	Bq/g	04/11/05	02/07/05	15	82.4	10	+3.19E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC Case No: NA  
 Report No.: AmchilBatchF5 SDG No.: B-A-163-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-C-162-B	02JJ-02-A	Bone	PU239/240	+1.27E-05	+2.40E-05	Bq/g	04/11/05	02/07/05	15	82.4	10	+4.76E-05	
B-C-162-B	02JJ-02-A	Bone	AM241	+5.03E-06	+3.23E-05	Bq/g	04/13/05	02/07/05	15	100.2	10	+2.64E-05	
B-C-162-B	02JJ-02-A	Bone	U236	-7.30E-06	+1.51E-05	Bq/g	04/13/05	02/07/05	15	117.1	04	+2.92E-05	
B-C-174-B	02JJ-08-A	Bone	SR90	+1.10E-03	+4.85E-04	Bq/g	05/03/05	02/07/05	15	87.4	B2	+1.93E-03	
B-C-174-B	02JJ-08-A	Bone	U234	+4.24E-04	+1.03E-04	Bq/g	04/13/05	02/07/05	15	107.4	04	+4.74E-05	
B-C-174-B	02JJ-08-A	Bone	U235	+1.22E-05	+1.88E-05	Bq/g	04/13/05	02/07/05	15	107.4	04	+4.95E-05	
B-C-174-B	02JJ-08-A	Bone	U238	+4.90E-04	+1.07E-04	Bq/g	04/13/05	02/07/05	15	107.4	04	+3.93E-05	
B-C-174-B	02JJ-08-A	Bone	PU238	-3.03E-06	+4.75E-06	Bq/g	04/11/05	02/07/05	15	91.9	14	+1.23E-05	
B-C-174-B	02JJ-08-A	Bone	PU239/240	+1.98E-05	+1.29E-05	Bq/g	04/11/05	02/07/05	15	91.9	14	+1.24E-05	
B-C-174-B	02JJ-08-A	Bone	AM241	+2.17E-05	+2.50E-05	Bq/g	04/13/05	02/07/05	15	94.5	14	+1.21E-05	
B-C-174-B	02JJ-08-A	Bone	U236	-1.95E-06	+1.87E-05	Bq/g	04/13/05	02/07/05	15	107.4	04	+3.18E-05	
B-J-167-B	02JJ-05-A	Bone	SR90	-5.02E-04	+4.92E-04	Bq/g	05/03/05	02/07/05	15	82.5	B1	+2.03E-03	
B-J-167-B	02JJ-05-A	Bone	U234	+6.55E-04	+1.30E-04	Bq/g	04/13/05	02/07/05	15	101.1	03	+4.11E-05	
B-J-167-B	02JJ-05-A	Bone	U235	+1.91E-05	+2.90E-05	Bq/g	04/13/05	02/07/05	15	101.1	03	+6.21E-05	
B-J-167-B	02JJ-05-A	Bone	U238	+6.54E-04	+1.31E-04	Bq/g	04/13/05	02/07/05	15	101.1	03	+4.54E-05	
B-J-167-B	02JJ-05-A	Bone	PU238	-5.48E-06	+6.15E-06	Bq/g	04/11/05	02/07/05	15	96.3	13	+2.72E-05	
B-J-167-B	02JJ-05-A	Bone	PU239/240	+2.17E-05	+3.39E-05	Bq/g	04/11/05	02/07/05	15	96.3	13	+3.61E-05	
B-J-167-B	02JJ-05-A	Bone	AM241	+7.30E-06	+3.31E-05	Bq/g	04/13/05	02/07/05	15	109.2	13	+2.41E-05	
B-J-167-B	02JJ-05-A	Bone	U236	+7.62E-06	+2.93E-05	Bq/g	04/13/05	02/07/05	15	101.1	03	+3.86E-05	
B-K-171-B	02JJ-06-A	Bone	SR90	+7.68E-04	+3.09E-03	Bq/g	05/03/05	02/07/05	2.31	86.1	B3	+1.26E-02	
B-K-171-B	02JJ-06-A	Bone	U234	+2.31E-02	+3.19E-03	Bq/g	04/13/05	02/07/05	2.31	109.2	05	+3.16E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RICCase No: NAReport No.: AmchitBatchF5SDG No.: B-A-163-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-171-B	02JJ-06-A	Bone	U235	+1.40E-03	+3.92E-04	Bq/g	04/13/05	02/07/05	2.31	109.2	05	+3.79E-04	
B-K-171-B	02JJ-06-A	Bone	U238	+2.56E-02	+3.86E-03	Bq/g	04/13/05	02/07/05	2.31	109.2	05	+2.85E-04	
B-K-171-B	02JJ-06-A	Bone	PU238	-6.79E-05	+8.37E-05	Bq/g	04/11/05	02/07/05	2.31	90.3	08	+3.80E-04	
B-K-171-B	02JJ-06-A	Bone	PU239/240	+2.23E-06	+4.63E-05	Bq/g	04/11/05	02/07/05	2.31	90.3	08	+4.94E-04	
B-K-171-B	02JJ-06-A	Bone	AM241	+1.02E-04	+1.61E-04	Bq/g	04/13/05	02/07/05	2.31	103.7	03	+1.85E-04	
B-K-171-B	02JJ-06-A	Bone	U236	+5.18E-05	+1.89E-04	Bq/g	04/13/05	02/07/05	2.31	109.2	05	+2.02E-04	
B-K-172-B	02JJ-07-A	Bone	SR90	+3.56E-02	+4.37E-03	Bq/g	05/03/05	02/07/05	2.16	81.9	A1	+1.54E-02	
B-K-172-B	02JJ-07-A	Bone	U234	-1.49E-05	+3.76E-04	Bq/g	04/13/05	02/07/05	2.16	107.0	06	+2.21E-04	
B-K-172-B	02JJ-07-A	Bone	U235	-4.25E-05	+6.97E-05	Bq/g	04/13/05	02/07/05	2.16	107.0	06	+4.14E-04	
B-K-172-B	02JJ-07-A	Bone	U238	+2.58E-05	+8.49E-05	Bq/g	04/13/05	02/07/05	2.16	107.0	06	+1.84E-04	
B-K-172-B	02JJ-07-A	Bone	PU238	+4.08E-02	+4.78E-03	Bq/g	04/13/05	02/07/05	2.16	85.2	08	+4.85E-04	
B-K-172-B	02JJ-07-A	Bone	PU239/240	+2.25E-02	+2.91E-03	Bq/g	04/13/05	02/07/05	2.16	85.2	08	+5.46E-04	
B-K-172-B	02JJ-07-A	Bone	AM241	+2.68E-02	+2.53E-03	Bq/g	04/13/05	02/07/05	2.16	112.6	04	+9.32E-05	
B-K-172-B	02JJ-07-A	Bone	U236	-8.92E-05	+1.09E-04	Bq/g	04/13/05	02/07/05	2.16	107.0	06	+3.11E-04	
B-L-164-B	02JJ-04-A	Bone	SR90	-1.71E-04	+5.30E-04	Bq/g	05/03/05	02/07/05	15	76.4	A4	+2.17E-03	
B-L-164-B	02JJ-04-A	Bone	U234	+3.67E-04	+9.43E-05	Bq/g	04/13/05	02/07/05	15	105.2	06	+2.70E-05	
B-L-164-B	02JJ-04-A	Bone	U235	+1.06E-05	+1.65E-05	Bq/g	04/13/05	02/07/05	15	105.2	06	+5.41E-05	
B-L-164-B	02JJ-04-A	Bone	U238	+3.29E-04	+8.12E-05	Bq/g	04/13/05	02/07/05	15	105.2	06	+3.99E-05	
B-L-164-B	02JJ-04-A	Bone	PU238	-6.95E-06	+7.88E-06	Bq/g	04/11/05	02/07/05	15	93.3	12	+3.26E-05	
B-L-164-B	02JJ-04-A	Bone	PU239/240	+8.46E-06	+1.75E-05	Bq/g	04/11/05	02/07/05	15	93.3	12	+2.90E-05	
B-L-164-B	02JJ-04-A	Bone	AM241	+8.52E-06	+3.58E-05	Bq/g	04/13/05	02/07/05	15	101.1	12	+3.03E-05	

See Key for Form I.

Comments:



RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF5SDG No.: B-A-163-B

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-L-164-B	02JJ-04-A	Bone	U236	-1.37E-05	+1.64E-05	Bq/g	04/13/05	02/07/05	15	105.2	06	+3.64E-05	

See Key for Form I.

Comments:

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## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF5SDG No.: B-A-163-B

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	+1.78E-02	+9.23E-03	NA	NA	Bq/sp1	NA%	05/03/2005	65.7%	B4	+3.68E-02	
REAGENT	BLK	U234	+4.53E-04	+6.13E-04	NA	NA	Bq/sp1	NA%	04/13/2005	92.2%	02	+6.09E-04	
REAGENT	BLK	U235	-1.22E-05	-1.96E-05	NA	NA	Bq/sp1	NA%	04/13/2005	92.2%	02	+8.40E-04	
REAGENT	BLK	U238	-9.74E-05	-1.61E-04	NA	NA	Bq/sp1	NA%	04/13/2005	92.2%	02	+6.67E-04	
REAGENT	BLK	PU238	+4.55E-05	+7.13E-05	NA	NA	Bq/sp1	NA%	04/13/2005	78.9%	02	+6.32E-04	
REAGENT	BLK	PU239/240	+4.55E-05	+7.14E-05	NA	NA	Bq/sp1	NA%	04/13/2005	78.9%	02	+6.33E-04	
REAGENT	BLK	AM241	+2.10E-04	+3.05E-04	NA	NA	Bq/sp1	NA%	04/13/2005	86.2%	15	+5.53E-04	
REAGENT	BLK	U236	+1.41E-04	+2.21E-04	NA	NA	Bq/sp1	NA%	04/13/2005	92.2%	02	+7.18E-04	
REAGENT	LCS	SR90	+6.42E+00	+2.95E-01	+7.10E+00	NA	Bq/mL	90.4%	05/03/2005	70.0%	A2	+7.83E-02	
REAGENT	LCS	U238	+1.99E-01	+2.92E-02	+1.99E-01	NA	Bq/mL	99.6%	04/13/2005	93.7%	06	+1.09E-03	
REAGENT	LCS	PU239/240	+1.48E-01	+1.77E-02	+1.50E-01	NA	Bq/mL	98.6%	04/13/2005	86.4%	08	+2.32E-03	
REAGENT	LCS	AM241	+1.52E-01	+1.45E-02	+1.55E-01	NA	Bq/mL	98.0%	04/13/2005	94.6%	05	+1.61E-03	

See Key for Form II.

Comments:

Project: **Alpha and Sr-90 Analysis for Amchitka Island (Batch 5)**  
 Laboratory: RTC  
 Report #: AmchitBatchF5  
 SDG#: B-A-163-B

### Summary of 2 and 3 sigma activities

Below are the results for Sr90, U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 5 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
B-A-163-B	02JJ-03-A	U234	9.63E-04	1.74E-04	5.5
B-A-163-B	02JJ-03-A	U235	6.53E-05	3.07E-05	2.1
B-A-163-B	02JJ-03-A	U238	9.40E-04	1.78E-04	5.3
B-B-154-B	02JJ-01-A	U234	2.18E-03	3.17E-04	6.9
B-B-154-B	02JJ-01-A	U235	1.16E-04	4.04E-05	2.9
B-B-154-B	02JJ-01-A	U238	1.83E-03	3.01E-04	6.1
B-C-162-B	02JJ-02-A	U234	8.57E-04	1.57E-04	5.5
B-C-162-B	02JJ-02-A	U235	5.30E-05	2.50E-05	2.1
B-C-162-B	02JJ-02-A	U238	7.79E-04	1.50E-04	5.2
B-C-174-B	02JJ-08-A	SR90	1.10E-03	4.85E-04	2.3
B-C-174-B	02JJ-08-A	U234	4.24E-04	1.03E-04	4.1
B-C-174-B	02JJ-08-A	U238	4.90E-04	1.07E-04	4.6
B-J-167-B	02JJ-05-A	U234	6.55E-04	1.30E-04	5.0
B-J-167-B	02JJ-05-A	U238	6.54E-04	1.31E-04	5.0
B-K-171-B	02JJ-06-A	U234	2.31E-02	3.19E-03	7.2
B-K-171-B	02JJ-06-A	U235	1.40E-03	3.92E-04	3.6
B-K-171-B	02JJ-06-A	U238	2.56E-02	3.86E-03	6.6
B-K-172-B	02JJ-07-A	AM241	2.68E-02	2.53E-03	10.6
B-K-172-B	02JJ-07-A	PU238	4.08E-02	4.78E-03	8.5
B-K-172-B	02JJ-07-A	PU239/240	2.25E-02	2.91E-03	7.7
B-K-172-B	02JJ-07-A	SR90	3.56E-02	4.37E-03	8.1
B-L-164-B	02JJ-04-A	U234	3.67E-04	9.43E-05	3.9
B-L-164-B	02JJ-04-A	U238	3.29E-04	8.12E-05	4.1

**Alpha and Sr-90 Analysis for Amchitka Island (Batch 5)**  
**Summary of 2 and 3 sigma activities**

Page 2

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 6**  
**Sr-90**

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RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Sr-90 Analysis for Amchitka Island (Batch 6)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF136 Method Type: A/B

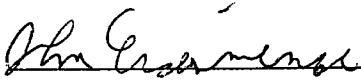
Approved SAP No.: NA SDG No.: S-A-175-A

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>S-A-175-A</u>	<u>02JK-03-A</u>
<u>S-A-178-A</u>	<u>02JK-06-A</u>
<u>S-B-66-A</u>	<u>02EQ-11-A</u>
<u>S-C-170-A</u>	<u>02JK-02-A</u>
<u>S-C-176-A</u>	<u>02JK-04-A</u>
<u>S-J-169-A</u>	<u>02JK-01-A</u>
<u>S-J-177-A</u>	<u>02JK-05-A</u>
<u>S-K-116-A</u>	<u>02GM-12-A</u>
<u>S-K-118-A</u>	<u>02GM-14-A</u>
<u>S-K-180-A</u>	<u>02JK-07-A</u>
<u>S-K-181-A</u>	<u>02JK-08-A</u>
<u>S-L-72-A</u>	<u>02EQ-17-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF136SDG No.: S-A-175-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
S-A-175-A	02JK-03-A	SoftTiss	SR90	-4.06E-06	+7.44E-05	Bq/g	04/12/05	02/10/05	85	91.8	A3	+3.08E-04	
S-A-178-A	02JK-06-A	SoftTiss	SR90	-1.30E-05	+7.06E-05	Bq/g	04/12/05	02/10/05	85	95.1	B2	+2.95E-04	
S-B-66-A	02EQ-11-A	SoftTiss	SR90	-1.83E-05	+7.75E-05	Bq/g	04/13/05	11/18/04	85	96.9	A1	+3.20E-04	
S-C-170-A	02JK-02-A	SoftTiss	SR90	-7.91E-06	+7.20E-05	Bq/g	04/12/05	02/10/05	85	94.1	A2	+2.99E-04	
S-C-176-A	02JK-04-A	SoftTiss	SR90	-1.05E-05	+7.08E-05	Bq/g	04/12/05	02/10/05	85	94.1	A4	+2.97E-04	
S-J-169-A	02JK-01-A	SoftTiss	SR90	+2.89E-05	+7.62E-05	Bq/g	04/12/05	02/10/05	85	90.0	A1	+3.14E-04	
S-J-177-A	02JK-05-A	SoftTiss	SR90	+1.75E-05	+7.28E-05	Bq/g	04/12/05	02/10/05	85	92.0	B1	+3.03E-04	
S-K-116-A	02GM-12-A	SoftTiss	SR90	-4.66E-05	+8.22E-05	Bq/g	04/13/05	12/17/04	85	90.3	A3	+3.42E-04	
S-K-118-A	02GM-14-A	SoftTiss	SR90	-1.93E-05	+7.42E-05	Bq/g	04/13/05	12/17/04	85	98.4	A4	+3.11E-04	
S-K-180-A	02JK-07-A	SoftTiss	SR90	+5.33E-05	+6.97E-05	Bq/g	04/12/05	02/10/05	87.01	93.2	B3	+2.90E-04	
S-K-181-A	02JK-08-A	SoftTiss	SR90	+2.00E-05	+7.73E-05	Bq/g	04/13/05	02/10/05	85.49	94.0	B1	+3.22E-04	
S-L-72-A	02EQ-17-A	SoftTiss	SR90	-1.58E-04	+9.59E-05	Bq/g	04/13/05	11/18/04	70	93.3	A2	+4.01E-04	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF136SDG No.: S-A-175-A

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	-5.88E-03	-6.28E-03	NA	NA	Bq/sple	NA%	04/12/2005	89.3%	B4	+2.64E-02	
REAGENT	LCS	SR90	+6.78E+00	+3.05E-01	+7.10E+00	NA	Bq/mL	95.4%	04/13/2005	92.4%	B2	+5.66E-02	

See Key for Form II.

Comments: \_\_\_\_\_

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Project: Sr-90 Analysis for Amchitka Island (Batch 6)  
Laboratory: RTC  
Report #: AmchitBatchF136  
SDG#: S-A-175-A

### Summary of 2 and 3 sigma activities

There were no results for Sr-90 for Batch 6 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**Batch 7**  
**ALPHA**

05/26/2005

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RADIOANALYTICAL ANALYSES DATA PACKAGE

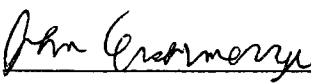
Project Title:	<u>Alpha Analysis for Amchitka (Batch 7)</u>		
Lab Name:	<u>RTC</u>	Case No:	<u>NA</u>
Report No.:	<u>AmchitBatchF7</u>	Method Type:	<u>A/B</u>
Approved SAP No.:	<u>NA</u>	SDG No.:	<u>K-AA-198-A</u>

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>K-AA-198-A</u>	<u>02MN-06-A</u>
<u>K-AA-200-A</u>	<u>02MN-08-A</u>
<u>K-AA-202-A</u>	<u>02MN-10-A</u>
<u>K-AA-204-A</u>	<u>02MN-12-A</u>
<u>K-AA-207-A</u>	<u>02MN-15-A</u>
<u>K-AA-209-A</u>	<u>02MN-17-A</u>
<u>K-AA-210-A</u>	<u>02MN-18-A</u>
<u>K-AA-211-A</u>	<u>02MN-19-A</u>
<u>K-CC-193-A</u>	<u>02MN-01-A</u>
<u>K-CC-194-A</u>	<u>02MN-02-A</u>
<u>K-CC-195-A</u>	<u>02MN-03-A</u>
<u>K-CC-196-A</u>	<u>02MN-04-A</u>
<u>K-CC-197-A</u>	<u>02MN-05-A</u>
<u>K-CC-199-A</u>	<u>02MN-07-A</u>
<u>K-CC-201-A</u>	<u>02MN-09-A</u>
<u>K-CC-203-A</u>	<u>02MN-11-A</u>
<u>K-CC-205-A</u>	<u>02MN-13-A</u>
<u>K-CC-206-A</u>	<u>02MN-14-A</u>
<u>K-CC-208-A</u>	<u>02MN-16-A</u>
<u>K-CC-212-A</u>	<u>02MN-20-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 05/26/2005

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchFZ

Case No: NA  
SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-198-A	02MN-06-A	Kelp	U234	+1.83E-04	+7.70E-05	Bq/g	05/13/05	04/11/05	15	94.9	03	+3.49E-05	
K-AA-198-A	02MN-06-A	Kelp	U235	-9.30E-06	+1.07E-05	Bq/g	05/13/05	04/11/05	15	94.9	03	+3.91E-05	
K-AA-198-A	02MN-06-A	Kelp	U238	+1.71E-04	+7.72E-05	Bq/g	05/13/05	04/11/05	15	94.9	03	+3.82E-05	
K-AA-198-A	02MN-06-A	Kelp	PU238	+4.78E-06	+8.85E-06	Bq/g	05/13/05	04/11/05	15	87.9	14	+1.29E-05	
K-AA-198-A	02MN-06-A	Kelp	PU239/240	+1.62E-05	+2.51E-05	Bq/g	05/13/05	04/11/05	15	87.9	14	+3.91E-05	
K-AA-198-A	02MN-06-A	Kelp	AM241	-3.03E-07	+2.19E-05	Bq/g	05/13/05	04/11/05	15	99.0	10	+2.67E-05	
K-AA-198-A	02MN-06-A	Kelp	U236	+3.56E-06	+9.91E-06	Bq/g	05/13/05	04/11/05	15	94.9	03	+3.49E-05	
K-AA-200-A	02MN-08-A	Kelp	U234	+7.50E-04	+1.56E-04	Bq/g	05/13/05	04/11/05	15	106.5	05	+2.67E-05	
K-AA-200-A	02MN-08-A	Kelp	U235	+5.58E-05	+2.87E-05	Bq/g	05/13/05	04/11/05	15	106.5	05	+4.03E-05	
K-AA-200-A	02MN-08-A	Kelp	U238	+6.33E-04	+1.50E-04	Bq/g	05/13/05	04/11/05	15	106.5	05	+3.20E-05	
K-AA-200-A	02MN-08-A	Kelp	PU238	+3.60E-06	+7.71E-06	Bq/g	05/13/05	04/11/05	15	87.8	16	+2.57E-05	
K-AA-200-A	02MN-08-A	Kelp	PU239/240	+4.11E-05	+1.88E-05	Bq/g	05/13/05	04/11/05	15	87.8	16	+3.08E-05	
K-AA-200-A	02MN-08-A	Kelp	AM241	+2.53E-05	+2.19E-05	Bq/g	05/13/05	04/11/05	15	102.6	12	+2.65E-05	
K-AA-200-A	02MN-08-A	Kelp	U236	+6.99E-09	+5.19E-06	Bq/g	05/13/05	04/11/05	15	106.5	05	+3.20E-05	
K-AA-202-A	02MN-10-A	Kelp	U234	+1.02E-03	+2.21E-04	Bq/g	05/13/05	04/11/05	15	68.4	08	+4.95E-05	
K-AA-202-A	02MN-10-A	Kelp	U235	+8.23E-05	+4.13E-05	Bq/g	05/13/05	04/11/05	15	68.4	08	+5.21E-05	
K-AA-202-A	02MN-10-A	Kelp	U238	+7.57E-04	+1.92E-04	Bq/g	05/13/05	04/11/05	15	68.4	08	+4.14E-05	
K-AA-202-A	02MN-10-A	Kelp	PU238	+3.12E-06	+7.26E-06	Bq/g	05/13/05	04/11/05	15	60.6	10	+4.34E-05	
K-AA-202-A	02MN-10-A	Kelp	PU239/240	+2.83E-05	+4.11E-05	Bq/g	05/13/05	04/11/05	15	60.6	10	+4.89E-05	
K-AA-202-A	02MN-10-A	Kelp	AM241	+8.67E-06	+2.01E-05	Bq/g	05/13/05	04/11/05	15	64.8	14	+1.76E-05	
K-AA-202-A	02MN-10-A	Kelp	U236	-6.75E-06	+8.20E-06	Bq/g	05/13/05	04/11/05	15	68.4	08	+4.95E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF7SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-204-A	02MN-12-A	Kelp	U234	+9.69E-04	+1.87E-04	Bq/g	05/13/05	04/11/05	15	100.2	02	+3.32E-05	
K-AA-204-A	02MN-12-A	Kelp	U235	+1.75E-05	+3.46E-05	Bq/g	05/13/05	04/11/05	15	100.2	02	+4.18E-05	
K-AA-204-A	02MN-12-A	Kelp	U238	+9.45E-04	+1.99E-04	Bq/g	05/13/05	04/11/05	15	100.2	02	+3.73E-05	
K-AA-204-A	02MN-12-A	Kelp	PU238	-1.35E-06	+5.78E-06	Bq/g	05/13/05	04/11/05	15	89.7	12	+2.52E-05	
K-AA-204-A	02MN-12-A	Kelp	PU239/240	+7.41E-06	+1.26E-05	Bq/g	05/13/05	04/11/05	15	89.7	12	+2.52E-05	
K-AA-204-A	02MN-12-A	Kelp	AM241	+3.27E-05	+2.31E-05	Bq/g	05/13/05	04/11/05	15	98.0	16	+2.31E-05	
K-AA-204-A	02MN-12-A	Kelp	U236	-3.78E-06	+4.39E-06	Bq/g	05/13/05	04/11/05	15	100.2	02	+2.77E-05	
K-AA-207-A	02MN-15-A	Kelp	U234	+2.82E-04	+9.29E-05	Bq/g	05/13/05	04/11/05	15	101.7	05	+1.47E-05	
K-AA-207-A	02MN-15-A	Kelp	U235	+1.77E-05	+3.48E-05	Bq/g	05/13/05	04/11/05	15	101.7	05	+4.21E-05	
K-AA-207-A	02MN-15-A	Kelp	U238	+2.55E-04	+9.24E-05	Bq/g	05/13/05	04/11/05	15	101.7	05	+3.34E-05	
K-AA-207-A	02MN-15-A	Kelp	PU238	-1.16E-06	+5.67E-06	Bq/g	05/13/05	04/11/05	15	98.9	15	+2.16E-05	
K-AA-207-A	02MN-15-A	Kelp	PU239/240	+4.29E-05	+1.76E-05	Bq/g	05/13/05	04/11/05	15	98.9	15	+2.59E-05	
K-AA-207-A	02MN-15-A	Kelp	AM241	-8.33E-07	+2.14E-05	Bq/g	05/17/05	04/11/05	15	103.6	10	+2.54E-05	
K-AA-207-A	02MN-15-A	Kelp	U236	+1.13E-07	+5.31E-06	Bq/g	05/13/05	04/11/05	15	101.7	05	+3.34E-05	
K-AA-209-A	02MN-17-A	Kelp	U234	+6.91E-04	+1.43E-04	Bq/g	05/13/05	04/11/05	15	102.9	03	+2.39E-05	
K-AA-209-A	02MN-17-A	Kelp	U235	+3.86E-05	+5.54E-05	Bq/g	05/13/05	04/11/05	15	102.9	03	+4.78E-05	
K-AA-209-A	02MN-17-A	Kelp	U238	+5.57E-04	+1.35E-04	Bq/g	05/13/05	04/11/05	15	102.9	03	+3.79E-05	
K-AA-209-A	02MN-17-A	Kelp	PU238	+8.45E-06	+1.36E-05	Bq/g	05/13/05	04/11/05	15	87.9	09	+2.53E-05	
K-AA-209-A	02MN-17-A	Kelp	PU239/240	+3.55E-05	+1.72E-05	Bq/g	05/13/05	04/11/05	15	87.9	09	+3.03E-05	
K-AA-209-A	02MN-17-A	Kelp	AM241	+2.60E-05	+2.19E-05	Bq/g	05/17/05	04/11/05	15	108.7	12	+2.81E-05	
K-AA-209-A	02MN-17-A	Kelp	U236	-1.52E-06	+3.87E-06	Bq/g	05/13/05	04/11/05	15	102.9	03	+3.22E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF7SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-210-A	02MN-18-A	Kelp	U234	+1.07E-03	+3.18E-04	Bq/g	05/13/05	04/11/05	15	28.3	04	+1.48E-04	
K-AA-210-A	02MN-18-A	Kelp	U235	+1.70E-04	+9.75E-05	Bq/g	05/13/05	04/11/05	15	28.3	04	+1.71E-04	
K-AA-210-A	02MN-18-A	Kelp	U238	+1.06E-03	+3.26E-04	Bq/g	05/13/05	04/11/05	15	28.3	04	+1.20E-04	
K-AA-210-A	02MN-18-A	Kelp	PU238	-4.74E-06	+9.39E-06	Bq/g	05/13/05	04/11/05	15	25.0	10	+8.82E-05	
K-AA-210-A	02MN-18-A	Kelp	PU239/240	+7.78E-05	+1.13E-04	Bq/g	05/13/05	04/11/05	15	25.0	10	+1.40E-04	
K-AA-210-A	02MN-18-A	Kelp	AM241	+2.82E-06	+2.62E-05	Bq/g	05/17/05	04/11/05	15	36.1	13	+8.21E-05	
K-AA-210-A	02MN-18-A	Kelp	U236	-7.73E-06	+9.74E-06	Bq/g	05/13/05	04/11/05	15	28.3	04	+1.00E-04	
K-AA-211-A	02MN-19-A	Kelp	U234	+8.02E-04	+1.65E-04	Bq/g	05/13/05	04/11/05	15	102.4	05	+1.46E-05	
K-AA-211-A	02MN-19-A	Kelp	U235	+3.98E-05	+2.45E-05	Bq/g	05/13/05	04/11/05	15	102.4	05	+3.50E-05	
K-AA-211-A	02MN-19-A	Kelp	U238	+6.85E-04	+1.59E-04	Bq/g	05/13/05	04/11/05	15	102.4	05	+3.32E-05	
K-AA-211-A	02MN-19-A	Kelp	PU238	+2.03E-06	+6.22E-06	Bq/g	05/13/05	04/11/05	15	94.6	11	+2.82E-05	
K-AA-211-A	02MN-19-A	Kelp	PU239/240	+1.68E-05	+2.54E-05	Bq/g	05/13/05	04/11/05	15	94.6	11	+3.48E-05	
K-AA-211-A	02MN-19-A	Kelp	AM241	+5.36E-07	+1.73E-05	Bq/g	05/17/05	04/11/05	15	110.4	14	+1.03E-05	
K-AA-211-A	02MN-19-A	Kelp	U236	+1.59E-06	+7.16E-06	Bq/g	05/13/05	04/11/05	15	102.4	05	+2.78E-05	
K-AA-211-A	02MN-19-A	Kelp	U234	+4.82E-03	+6.53E-04	Bq/g	05/13/05	04/11/05	15	89.2	03	+4.37E-05	
K-AA-211-A	02MN-19-A	Kelp	U235	+1.98E-04	+6.01E-05	Bq/g	05/13/05	04/11/05	15	89.2	03	+5.86E-05	
K-AA-211-A	02MN-19-A	Kelp	U238	+4.37E-03	+6.76E-04	Bq/g	05/13/05	04/11/05	15	89.2	03	+4.65E-05	
K-AA-211-A	02MN-19-A	Kelp	PU238	-1.46E-06	+5.84E-06	Bq/g	05/13/05	04/11/05	15	81.9	09	+2.71E-05	
K-AA-211-A	02MN-19-A	Kelp	PU239/240	+4.73E-05	+2.12E-05	Bq/g	05/13/05	04/11/05	15	81.9	09	+3.66E-05	
K-AA-211-A	02MN-19-A	Kelp	AM241	+2.79E-05	+2.20E-05	Bq/g	05/13/05	04/11/05	15	104.0	13	+2.53E-05	
K-AA-211-A	02MN-19-A	Kelp	U236	+3.94E-06	+1.04E-05	Bq/g	05/13/05	04/11/05	15	89.2	03	+3.71E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RICCase No: NAReport No.: AmchitBatchF7SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-194-A	02MN-02-A	Kelp	U234	+3.92E-03	+5.50E-04	Bq/g	05/13/05	04/11/05	15	103.0	04	+4.09E-05	
K-CC-194-A	02MN-02-A	Kelp	U235	+1.86E-04	+5.79E-05	Bq/g	05/13/05	04/11/05	15	103.0	04	+5.90E-05	
K-CC-194-A	02MN-02-A	Kelp	U238	+3.73E-03	+5.91E-04	Bq/g	05/13/05	04/11/05	15	103.0	04	+4.09E-05	
K-CC-194-A	02MN-02-A	Kelp	PU238	+3.70E-06	+7.84E-06	Bq/g	05/13/05	04/11/05	15	83.1	10	+2.65E-05	
K-CC-194-A	02MN-02-A	Kelp	PU239/240	+5.58E-05	+2.44E-05	Bq/g	05/13/05	04/11/05	15	83.1	10	+4.72E-05	
K-CC-194-A	02MN-02-A	Kelp	AM241	+1.19E-06	+1.75E-05	Bq/g	05/13/05	04/11/05	15	104.9	14	+1.09E-05	
K-CC-194-A	02MN-02-A	Kelp	U236	+1.77E-05	+2.78E-05	Bq/g	05/13/05	04/11/05	15	103.0	04	+2.77E-05	
K-CC-195-A	02MN-03-A	Kelp	U234	+3.27E-03	+4.69E-04	Bq/g	05/13/05	04/11/05	15	106.2	05	+3.21E-05	
K-CC-195-A	02MN-03-A	Kelp	U235	+1.34E-04	+4.58E-05	Bq/g	05/13/05	04/11/05	15	106.2	05	+4.04E-05	
K-CC-195-A	02MN-03-A	Kelp	U238	+2.82E-03	+4.63E-04	Bq/g	05/13/05	04/11/05	15	106.2	05	+3.21E-05	
K-CC-195-A	02MN-03-A	Kelp	PU238	-1.40E-06	+5.80E-06	Bq/g	05/13/05	04/11/05	15	86.0	11	+2.60E-05	
K-CC-195-A	02MN-03-A	Kelp	PU239/240	+4.38E-05	+2.04E-05	Bq/g	05/13/05	04/11/05	15	86.0	11	+3.83E-05	
K-CC-195-A	02MN-03-A	Kelp	AM241	+4.65E-06	+2.69E-05	Bq/g	05/13/05	04/11/05	15	104.6	15	+3.04E-05	
K-CC-195-A	02MN-03-A	Kelp	U236	+1.39E-08	+5.20E-06	Bq/g	05/13/05	04/11/05	15	106.2	05	+3.21E-05	
K-CC-196-A	02MN-04-A	Kelp	U234	+1.88E-03	+3.03E-04	Bq/g	05/13/05	04/11/05	15	103.4	06	+3.29E-05	
K-CC-196-A	02MN-04-A	Kelp	U235	+1.07E-04	+4.16E-05	Bq/g	05/13/05	04/11/05	15	103.4	06	+5.11E-05	
K-CC-196-A	02MN-04-A	Kelp	U238	+1.71E-03	+3.09E-04	Bq/g	05/13/05	04/11/05	15	103.4	06	+3.29E-05	
K-CC-196-A	02MN-04-A	Kelp	PU238	-1.33E-06	+5.76E-06	Bq/g	05/13/05	04/11/05	15	91.3	12	+2.47E-05	
K-CC-196-A	02MN-04-A	Kelp	PU239/240	+1.90E-05	+2.79E-05	Bq/g	05/13/05	04/11/05	15	91.3	12	+3.34E-05	
K-CC-196-A	02MN-04-A	Kelp	AM241	+8.23E-06	+2.78E-05	Bq/g	05/13/05	04/11/05	15	108.7	16	+2.09E-05	
K-CC-196-A	02MN-04-A	Kelp	U236	-5.26E-06	+6.08E-06	Bq/g	05/13/05	04/11/05	15	103.4	06	+3.29E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchFZSDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-197-A	02MN-05-A	Kelp	U234	+1.84E-03	+3.11E-04	Bq/g	05/13/05	04/11/05	15	89.7	08	+3.78E-05	
K-CC-197-A	02MN-05-A	Kelp	U235	+9.23E-05	+3.92E-05	Bq/g	05/13/05	04/11/05	15	89.7	08	+3.98E-05	
K-CC-197-A	02MN-05-A	Kelp	U238	+1.78E-03	+3.33E-04	Bq/g	05/13/05	04/11/05	15	89.7	08	+4.25E-05	
K-CC-197-A	02MN-05-A	Kelp	PU238	-5.90E-06	+1.09E-05	Bq/g	05/13/05	04/11/05	15	87.8	08	+5.74E-05	
K-CC-197-A	02MN-05-A	Kelp	PU239/240	+3.87E-07	+2.70E-06	Bq/g	05/13/05	04/11/05	15	87.8	08	+6.54E-05	
K-CC-197-A	02MN-05-A	Kelp	AM241	-2.59E-06	+1.91E-05	Bq/g	05/13/05	04/11/05	15	104.6	09	+1.12E-05	
K-CC-197-A	02MN-05-A	Kelp	U236	+1.87E-05	+3.08E-05	Bq/g	05/13/05	04/11/05	15	89.7	08	+3.78E-05	
K-CC-199-A	02MN-07-A	Kelp	U234	+5.10E-03	+7.00E-04	Bq/g	05/13/05	04/11/05	15	95.7	04	+4.40E-05	
K-CC-199-A	02MN-07-A	Kelp	U235	+2.54E-04	+7.20E-05	Bq/g	05/13/05	04/11/05	15	95.7	04	+5.97E-05	
K-CC-199-A	02MN-07-A	Kelp	U238	+4.47E-03	+7.00E-04	Bq/g	05/13/05	04/11/05	15	95.7	04	+4.40E-05	
K-CC-199-A	02MN-07-A	Kelp	PU238	-1.26E-06	+5.72E-06	Bq/g	05/13/05	04/11/05	15	91.3	15	+2.34E-05	
K-CC-199-A	02MN-07-A	Kelp	PU239/240	+2.25E-05	+3.13E-05	Bq/g	05/13/05	04/11/05	15	91.3	15	+3.16E-05	
K-CC-199-A	02MN-07-A	Kelp	AM241	+2.81E-05	+2.28E-05	Bq/g	05/13/05	04/11/05	15	94.1	11	+2.85E-05	
K-CC-199-A	02MN-07-A	Kelp	U236	+1.92E-05	+2.99E-05	Bq/g	05/13/05	04/11/05	15	95.7	04	+2.98E-05	
K-CC-201-A	02MN-09-A	Kelp	U234	+2.90E-03	+4.26E-04	Bq/g	05/13/05	04/11/05	15	105.6	06	+3.22E-05	
K-CC-201-A	02MN-09-A	Kelp	U235	+1.18E-04	+4.34E-05	Bq/g	05/13/05	04/11/05	15	105.6	06	+5.00E-05	
K-CC-201-A	02MN-09-A	Kelp	U238	+2.33E-03	+3.96E-04	Bq/g	05/13/05	04/11/05	15	105.6	06	+3.22E-05	
K-CC-201-A	02MN-09-A	Kelp	PU238	+4.68E-06	+8.74E-06	Bq/g	05/13/05	04/11/05	15	92.1	09	+1.27E-05	
K-CC-201-A	02MN-09-A	Kelp	PU239/240	+1.98E-05	+2.80E-05	Bq/g	05/13/05	04/11/05	15	92.1	09	+2.89E-05	
K-CC-201-A	02MN-09-A	Kelp	AM241	+7.54E-06	+2.89E-05	Bq/g	05/13/05	04/11/05	15	103.0	13	+2.56E-05	
K-CC-201-A	02MN-09-A	Kelp	U236	+1.04E-05	+1.95E-05	Bq/g	05/13/05	04/11/05	15	105.6	06	+3.22E-05	

See Key for Form I.

Comments:



RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RIC  
Report No.: AmchitBatchF7

Case No: NA  
SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-203-A	02MN-11-A	Kelp	U234	+2.72E-03	+4.02E-04	Bq/g	05/13/05	04/11/05	15	111.3	01	+1.37E-05	
K-CC-203-A	02MN-11-A	Kelp	U235	+9.73E-05	+3.82E-05	Bq/g	05/13/05	04/11/05	15	111.3	01	+4.43E-05	
K-CC-203-A	02MN-11-A	Kelp	U238	+2.22E-03	+3.78E-04	Bq/g	05/13/05	04/11/05	15	111.3	01	+3.52E-05	
K-CC-203-A	02MN-11-A	Kelp	PU238	+1.99E-06	+6.19E-06	Bq/g	05/13/05	04/11/05	15	96.7	11	+2.76E-05	
K-CC-203-A	02MN-11-A	Kelp	PU239/240	+1.76E-05	+2.60E-05	Bq/g	05/13/05	04/11/05	15	96.7	11	+3.11E-05	
K-CC-203-A	02MN-11-A	Kelp	AM241	+1.57E-05	+3.58E-05	Bq/g	05/13/05	04/11/05	15	108.2	15	+2.94E-05	
K-CC-203-A	02MN-11-A	Kelp	U236	+1.51E-05	+2.55E-05	Bq/g	05/13/05	04/11/05	15	111.3	01	+3.12E-05	
K-CC-205-A	02MN-13-A	Kelp	U234	+9.03E-04	+1.86E-04	Bq/g	05/13/05	04/11/05	11.76	100.3	03	+3.13E-05	
K-CC-205-A	02MN-13-A	Kelp	U235	+6.81E-05	+3.58E-05	Bq/g	05/13/05	04/11/05	11.76	100.3	03	+5.81E-05	
K-CC-205-A	02MN-13-A	Kelp	U238	+7.22E-04	+1.74E-04	Bq/g	05/13/05	04/11/05	11.76	100.3	03	+4.61E-05	
K-CC-205-A	02MN-13-A	Kelp	PU238	+4.01E-03	+4.58E-04	Bq/g	05/13/05	04/11/05	11.76	96.3	13	+3.91E-05	
K-CC-205-A	02MN-13-A	Kelp	PU239/240	+4.71E-03	+5.24E-04	Bq/g	05/13/05	04/11/05	11.76	96.3	13	+4.90E-05	
K-CC-205-A	02MN-13-A	Kelp	AM241	+2.68E-03	+3.03E-04	Bq/g	05/17/05	04/11/05	11.76	100.2	01	+4.44E-05	
K-CC-205-A	02MN-13-A	Kelp	U236	+1.02E-05	+2.06E-05	Bq/g	05/13/05	04/11/05	11.76	100.3	03	+4.22E-05	
K-CC-206-A	02MN-14-A	Kelp	U234	+7.68E-04	+1.68E-04	Bq/g	05/13/05	04/11/05	13.86	98.2	04	+4.65E-05	
K-CC-206-A	02MN-14-A	Kelp	U235	+5.23E-05	+7.28E-05	Bq/g	05/13/05	04/11/05	13.86	98.2	04	+6.30E-05	
K-CC-206-A	02MN-14-A	Kelp	U238	+7.41E-04	+1.76E-04	Bq/g	05/13/05	04/11/05	13.86	98.2	04	+4.65E-05	
K-CC-206-A	02MN-14-A	Kelp	PU238	+7.51E-03	+7.66E-04	Bq/g	05/13/05	04/11/05	13.86	94.7	14	+1.30E-05	
K-CC-206-A	02MN-14-A	Kelp	PU239/240	+4.71E-03	+5.14E-04	Bq/g	05/13/05	04/11/05	13.86	94.7	14	+3.93E-05	
K-CC-206-A	02MN-14-A	Kelp	AM241	+5.90E-03	+5.08E-04	Bq/g	05/17/05	04/11/05	13.86	103.2	03	+3.09E-05	
K-CC-206-A	02MN-14-A	Kelp	U236	+3.62E-06	+1.00E-05	Bq/g	05/13/05	04/11/05	13.86	98.2	04	+1.65E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF7

Case No: NA  
SDG No.: K-AA-198-A

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-CC-208-A	02MN-16-A	Kelp	U234	+3.04E-03	+4.40E-04	Bq/g	05/13/05	04/11/05	15	108.1	06	+3.15E-05	
K-CC-208-A	02MN-16-A	Kelp	U235	+1.36E-04	+4.63E-05	Bq/g	05/13/05	04/11/05	15	108.1	06	+4.47E-05	
K-CC-208-A	02MN-16-A	Kelp	U238	+2.41E-03	+4.02E-04	Bq/g	05/13/05	04/11/05	15	108.1	06	+3.15E-05	
K-CC-208-A	02MN-16-A	Kelp	PU238	+3.56E-06	+7.68E-06	Bq/g	05/13/05	04/11/05	15	88.6	16	+2.54E-05	
K-CC-208-A	02MN-16-A	Kelp	PU239/240	+1.95E-05	+2.87E-05	Bq/g	05/13/05	04/11/05	15	88.6	16	+3.43E-05	
K-CC-208-A	02MN-16-A	Kelp	AM241	+4.62E-06	+2.58E-05	Bq/g	05/17/05	04/11/05	15	104.0	11	+2.15E-05	
K-CC-208-A	02MN-16-A	Kelp	U236	-2.70E-08	+5.15E-06	Bq/g	05/13/05	04/11/05	15	108.1	06	+3.15E-05	
K-CC-212-A	02MN-20-A	Kelp	U234	+2.08E-03	+3.23E-04	Bq/g	05/13/05	04/11/05	15	109.8	06	+3.10E-05	
K-CC-212-A	02MN-20-A	Kelp	U235	+1.23E-04	+4.30E-05	Bq/g	05/13/05	04/11/05	15	109.8	06	+3.90E-05	
K-CC-212-A	02MN-20-A	Kelp	U238	+1.86E-03	+3.28E-04	Bq/g	05/13/05	04/11/05	15	109.8	06	+3.10E-05	
K-CC-212-A	02MN-20-A	Kelp	PU238	-1.32E-06	+5.76E-06	Bq/g	05/13/05	04/11/05	15	91.7	12	+2.46E-05	
K-CC-212-A	02MN-20-A	Kelp	PU239/240	+5.24E-05	+2.13E-05	Bq/g	05/13/05	04/11/05	15	91.7	12	+3.32E-05	
K-CC-212-A	02MN-20-A	Kelp	AM241	+1.95E-05	+2.08E-05	Bq/g	05/17/05	04/11/05	15	101.8	15	+2.52E-05	
K-CC-212-A	02MN-20-A	Kelp	U236	+9.98E-06	+1.88E-05	Bq/g	05/13/05	04/11/05	15	109.8	06	+3.10E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF7SDG No.: K-AA-198-A

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uner +/-	Known Value	Known Uner +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	U234	+1.70E-03	+5.31E-04	NA	NA	Bq/sp1	NA%	05/13/2005	109.1%	01	+2.10E-04	
REAGENT	BLK	U235	+8.67E-05	+1.36E-04	NA	NA	Bq/sp1	NA%	05/13/2005	109.1%	01	+7.42E-04	
REAGENT	BLK	U238	+1.48E-03	+5.25E-04	NA	NA	Bq/sp1	NA%	05/13/2005	109.1%	01	+5.39E-04	
REAGENT	BLK	PU238	-5.01E-05	-8.04E-05	NA	NA	Bq/sp1	NA%	05/13/2005	89.6%	02	+5.57E-04	
REAGENT	BLK	PU239/240	+1.50E-05	+2.37E-05	NA	NA	Bq/sp1	NA%	05/13/2005	89.6%	02	+6.28E-04	
REAGENT	BLK	AM241	+1.63E-04	+2.36E-04	NA	NA	Bq/sp1	NA%	05/17/2005	98.3%	16	+4.13E-04	
REAGENT	BLK	U236	+3.44E-05	+5.50E-05	NA	NA	Bq/sp1	NA%	05/13/2005	109.1%	01	+4.78E-04	
REAGENT	LCS	U238	+2.13E-01	+3.08E-02	+1.99E-01	NA	Bq/mL	106.6%	05/13/2005	98.4%	08	+1.27E-03	
REAGENT	LCS	PU239/240	+1.55E-01	+1.53E-02	+1.50E-01	NA	Bq/sp1	103.3%	05/17/2005	119.5%	07	+6.74E-04	
REAGENT	LCS	AM241	+1.55E-01	+1.42E-02	+1.55E-01	NA	Bq/mL	100.0%	05/17/2005	101.6%	02	+8.23E-04	

See Key for Form II.

Comments:

Project: Alpha Analysis for Amchitka Island (Batch 7)  
 Laboratory: RTC  
 Report #: AmchitBatchF7  
 SDG#: K-AA-198-A

## Summary of 2 and 3 sigma activities

Below are the results for U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 7 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-AA-198-A	02MN-06-A	U234	1.83E-04	7.70E-05	2.4
K-AA-198-A	02MN-06-A	U238	1.71E-04	7.72E-05	2.2
K-AA-200-A	02MN-08-A	PU239/240	4.11E-05	1.88E-05	2.2
K-AA-200-A	02MN-08-A	U234	7.50E-04	1.56E-04	4.8
K-AA-200-A	02MN-08-A	U238	6.33E-04	1.50E-04	4.2
K-AA-202-A	02MN-10-A	U234	1.02E-03	2.21E-04	4.6
K-AA-202-A	02MN-10-A	U235	8.23E-05	4.13E-05	2.0
K-AA-202-A	02MN-10-A	U238	7.57E-04	1.92E-04	3.9
K-AA-204-A	02MN-12-A	U234	9.69E-04	1.87E-04	5.2
K-AA-204-A	02MN-12-A	U238	9.45E-04	1.99E-04	4.7
K-AA-207-A	02MN-15-A	PU239/240	4.29E-05	1.76E-05	2.4
K-AA-207-A	02MN-15-A	U234	2.82E-04	9.29E-05	3.0
K-AA-207-A	02MN-15-A	U238	2.55E-04	9.24E-05	2.8
K-AA-209-A	02MN-17-A	PU239/240	3.55E-05	1.72E-05	2.1
K-AA-209-A	02MN-17-A	U234	6.91E-04	1.43E-04	4.8
K-AA-209-A	02MN-17-A	U238	5.57E-04	1.35E-04	4.1
K-AA-210-A	02MN-18-A	U234	1.07E-03	3.18E-04	3.4
K-AA-210-A	02MN-18-A	U238	1.06E-03	3.26E-04	3.3
K-AA-211-A	02MN-19-A	U234	8.02E-04	1.65E-04	4.9
K-AA-211-A	02MN-19-A	U238	6.85E-04	1.59E-04	4.3
K-CC-193-A	02MN-01-A	PU239/240	4.73E-05	2.12E-05	2.2
K-CC-193-A	02MN-01-A	U234	4.82E-03	6.53E-04	7.4
K-CC-193-A	02MN-01-A	U235	1.98E-04	6.01E-05	3.3
K-CC-193-A	02MN-01-A	U238	4.37E-03	6.76E-04	6.5

# Alpha Analysis for Amchitka Island (Batch 7)

## Summary of 2 and 3 sigma activities

page 2

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-CC-194-A	02MN-02-A	PU239/240	5.58E-05	2.44E-05	2.3
K-CC-194-A	02MN-02-A	U234	3.92E-03	5.50E-04	7.1
K-CC-194-A	02MN-02-A	U235	1.86E-04	5.79E-05	3.2
K-CC-194-A	02MN-02-A	U238	3.73E-03	5.91E-04	6.3
K-CC-195-A	02MN-03-A	PU239/240	4.38E-05	2.04E-05	2.1
K-CC-195-A	02MN-03-A	U234	3.27E-03	4.69E-04	7.0
K-CC-195-A	02MN-03-A	U235	1.34E-04	4.58E-05	2.9
K-CC-195-A	02MN-03-A	U238	2.82E-03	4.63E-04	6.1
K-CC-196-A	02MN-04-A	U234	1.88E-03	3.03E-04	6.2
K-CC-196-A	02MN-04-A	U235	1.07E-04	4.16E-05	2.6
K-CC-196-A	02MN-04-A	U238	1.71E-03	3.09E-04	5.5
K-CC-197-A	02MN-05-A	U234	1.84E-03	3.11E-04	5.9
K-CC-197-A	02MN-05-A	U235	9.23E-05	3.92E-05	2.4
K-CC-197-A	02MN-05-A	U238	1.78E-03	3.33E-04	5.3
K-CC-199-A	02MN-07-A	U234	5.10E-03	7.00E-04	7.3
K-CC-199-A	02MN-07-A	U235	2.54E-04	7.20E-05	3.5
K-CC-199-A	02MN-07-A	U238	4.47E-03	7.00E-04	6.4
K-CC-201-A	02MN-09-A	U234	2.90E-03	4.26E-04	6.8
K-CC-201-A	02MN-09-A	U235	1.18E-04	4.34E-05	2.7
K-CC-201-A	02MN-09-A	U238	2.33E-03	3.96E-04	5.9
K-CC-203-A	02MN-11-A	U234	2.72E-03	4.02E-04	6.8
K-CC-203-A	02MN-11-A	U235	9.73E-05	3.82E-05	2.5
K-CC-203-A	02MN-11-A	U238	2.22E-03	3.78E-04	5.9
K-CC-205-A	02MN-13-A	AM241	2.68E-03	3.03E-04	8.8
K-CC-205-A	02MN-13-A	PU238	4.01E-03	4.58E-04	8.8
K-CC-205-A	02MN-13-A	PU239/240	4.71E-03	5.24E-04	9.0
K-CC-205-A	02MN-13-A	U234	9.03E-04	1.86E-04	4.9
K-CC-205-A	02MN-13-A	U238	7.22E-04	1.74E-04	4.1
K-CC-206-A	02MN-14-A	AM241	5.90E-03	5.08E-04	11.6
K-CC-206-A	02MN-14-A	PU238	7.51E-03	7.66E-04	9.8
K-CC-206-A	02MN-14-A	PU239/240	4.71E-03	5.14E-04	9.2
K-CC-206-A	02MN-14-A	U234	7.68E-04	1.68E-04	4.6
K-CC-206-A	02MN-14-A	U238	7.41E-04	1.76E-04	4.2

## Alpha Analysis for Amchitka Island (Batch 7)

### Summary of 2 and 3 sigma activities

page 3

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-CC-208-A	02MN-16-A	U234	3.04E-03	4.40E-04	6.9
K-CC-208-A	02MN-16-A	U235	1.36E-04	4.63E-05	2.9
K-CC-208-A	02MN-16-A	U238	2.41E-03	4.02E-04	6.0
K-CC-212-A	02MN-20-A	PU239/240	5.24E-05	2.13E-05	2.5
K-CC-212-A	02MN-20-A	U234	2.08E-03	3.23E-04	6.4
K-CC-212-A	02MN-20-A	U235	1.23E-04	4.30E-05	2.9
K-CC-212-A	02MN-20-A	U238	1.86E-03	3.28E-04	5.7

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 8A**  
**ALPHA**

06/15/2005

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Alpha Analysis for Amchitka (Batch 8A)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF8A Method Type: A/B

Approved SAP No.: NA SDG No.: B-K-215

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>B-K-215</u>	<u>02N6-01-A</u>
<u>B-K-216</u>	<u>02N6-02-A</u>
<u>B-K-217</u>	<u>02N6-03-A</u>
<u>B-K-218</u>	<u>02N6-04-A</u>
<u>B-K-219</u>	<u>02N6-05-A</u>
<u>B-K-220</u>	<u>02N6-06-A</u>
<u>B-K-221</u>	<u>02N6-07-A</u>
<u>B-K-222</u>	<u>02N6-08-A</u>
<u>B-K-223</u>	<u>02N6-09-A</u>
<u>B-K-225</u>	<u>02N6-10-A</u>

Comments: All pages Reviewed by: B.K. Schuetz 6/17/2005

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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature: J. G. Eisenmenger

Title: Technical Leader

Name: J. G. Eisenmenger

Date: 06/15/2005



RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTC  
Report No.: AmchitBatchF8ACase No: NA  
SDG No.: B-K-215

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-215	02N6-01-A	Bone	U234	+1.60E-05	+5.52E-05	Bq/g	05/18/05	04/19/05	15	105.7	01	+3.28E-05	
B-K-215	02N6-01-A	Bone	U235	+1.77E-06	+3.93E-05	Bq/g	05/18/05	04/19/05	15	105.7	01	+5.10E-05	
B-K-215	02N6-01-A	Bone	U238	-1.43E-07	+4.35E-05	Bq/g	05/18/05	04/19/05	15	105.7	01	+3.70E-05	
B-K-215	02N6-01-A	Bone	PU238	-2.89E-06	+2.11E-05	Bq/g	05/18/05	04/19/05	15	89.1	09	+2.49E-05	
B-K-215	02N6-01-A	Bone	PU239/240	+1.62E-05	+2.35E-05	Bq/g	05/18/05	04/19/05	15	89.1	09	+2.99E-05	
B-K-215	02N6-01-A	Bone	AM241	-2.50E-05	+2.04E-05	Bq/g	05/19/05	04/19/05	15	106.1	13	+3.30E-05	
B-K-215	02N6-01-A	Bone	U236	-1.48E-06	+3.79E-06	Bq/g	05/18/05	04/19/05	15	105.7	01	+2.74E-05	
B-K-216	02N6-02-A	Bone	U234	+1.47E-05	+5.53E-05	Bq/g	05/18/05	04/19/05	15	106.0	02	+4.42E-05	
B-K-216	02N6-02-A	Bone	U235	-1.29E-05	+2.76E-05	Bq/g	05/18/05	04/19/05	15	106.0	02	+3.30E-05	
B-K-216	02N6-02-A	Bone	U238	+2.25E-06	+4.41E-05	Bq/g	05/18/05	04/19/05	15	106.0	02	+4.42E-05	
B-K-216	02N6-02-A	Bone	PU238	-4.72E-06	+1.97E-05	Bq/g	05/18/05	04/19/05	15	94.7	10	+2.77E-05	
B-K-216	02N6-02-A	Bone	PU239/240	+8.09E-06	+1.28E-05	Bq/g	05/18/05	04/19/05	15	94.7	10	+3.42E-05	
B-K-216	02N6-02-A	Bone	AM241	-2.25E-05	+2.15E-05	Bq/g	05/19/05	04/19/05	15	93.7	14	+1.22E-05	
B-K-216	02N6-02-A	Bone	U236	+3.66E-06	+6.47E-06	Bq/g	05/18/05	04/19/05	15	106.0	02	+2.62E-05	
B-K-217	02N6-03-A	Bone	U234	-1.78E-05	+5.02E-05	Bq/g	05/18/05	04/19/05	15	101.2	03	+4.10E-05	
B-K-217	02N6-03-A	Bone	U235	-1.49E-05	+2.70E-05	Bq/g	05/18/05	04/19/05	15	101.2	03	+3.66E-05	
B-K-217	02N6-03-A	Bone	U238	+2.61E-05	+4.69E-05	Bq/g	05/18/05	04/19/05	15	101.2	03	+3.85E-05	
B-K-217	02N6-03-A	Bone	PU238	-2.79E-06	+2.11E-05	Bq/g	05/18/05	04/19/05	15	88.4	11	+2.52E-05	
B-K-217	02N6-03-A	Bone	PU239/240	+6.66E-06	+1.07E-05	Bq/g	05/18/05	04/19/05	15	88.4	11	+3.02E-05	
B-K-217	02N6-03-A	Bone	AM241	-1.82E-05	+2.57E-05	Bq/g	05/19/05	04/19/05	15	108.5	15	+2.37E-05	
B-K-217	02N6-03-A	Bone	U236	-1.31E-06	+3.61E-06	Bq/g	05/18/05	04/19/05	15	101.2	03	+2.42E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF8ASDG No.: B-K-215

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-218	02N6-04-A	Bone	U234	+4.19E-05	+5.87E-05	Bq/g	05/18/05	04/19/05	15	107.1	04	+3.59E-05	
B-K-218	02N6-04-A	Bone	U235	-1.18E-05	+2.81E-05	Bq/g	05/18/05	04/19/05	15	107.1	04	+4.95E-05	
B-K-218	02N6-04-A	Bone	U238	+6.93E-05	+5.57E-05	Bq/g	05/18/05	04/19/05	15	107.1	04	+4.75E-05	
B-K-218	02N6-04-A	Bone	PU238	-1.25E-05	+1.72E-05	Bq/g	05/18/05	04/19/05	15	92.8	12	+2.43E-05	
B-K-218	02N6-04-A	Bone	PU239/240	-1.71E-06	+2.18E-06	Bq/g	05/18/05	04/19/05	15	92.8	12	+2.43E-05	
B-K-218	02N6-04-A	Bone	AM241	-3.27E-05	+1.80E-05	Bq/g	05/19/05	04/19/05	15	105.3	16	+2.15E-05	
B-K-218	02N6-04-A	Bone	U236	+2.28E-06	+4.67E-06	Bq/g	05/18/05	04/19/05	15	107.1	04	+3.19E-05	
B-K-219	02N6-05-A	Bone	U234	+5.41E-05	+6.00E-05	Bq/g	05/18/05	04/19/05	15	111.2	05	+3.77E-05	
B-K-219	02N6-05-A	Bone	U235	-8.57E-06	+3.00E-05	Bq/g	05/18/05	04/19/05	15	111.2	05	+3.85E-05	
B-K-219	02N6-05-A	Bone	U238	+7.65E-05	+5.51E-05	Bq/g	05/18/05	04/19/05	15	111.2	05	+2.55E-05	
B-K-219	02N6-05-A	Bone	PU238	-4.06E-06	+2.02E-05	Bq/g	05/18/05	04/19/05	15	85.6	13	+3.06E-05	
B-K-219	02N6-05-A	Bone	PU239/240	+1.17E-05	+1.77E-05	Bq/g	05/18/05	04/19/05	15	85.6	13	+3.06E-05	
B-K-219	02N6-05-A	Bone	AM241	-2.21E-05	+2.17E-05	Bq/g	06/02/05	04/19/05	15	93.8	12	+1.27E-05	
B-K-219	02N6-05-A	Bone	U236	+8.52E-06	+1.33E-05	Bq/g	05/18/05	04/19/05	15	111.2	05	+2.55E-05	
B-K-220	02N6-06-A	Bone	U234	+7.43E-05	+6.26E-05	Bq/g	05/18/05	04/19/05	15	109.5	06	+3.10E-05	
B-K-220	02N6-06-A	Bone	U235	-8.44E-06	+3.01E-05	Bq/g	05/18/05	04/19/05	15	109.5	06	+3.91E-05	
B-K-220	02N6-06-A	Bone	U238	+7.38E-05	+5.48E-05	Bq/g	05/18/05	04/19/05	15	109.5	06	+2.59E-05	
B-K-220	02N6-06-A	Bone	PU238	-4.33E-06	+2.01E-05	Bq/g	05/18/05	04/19/05	15	44.0	14	+4.92E-05	
B-K-220	02N6-06-A	Bone	PU239/240	+2.29E-05	+3.45E-05	Bq/g	05/18/05	04/19/05	15	44.0	14	+5.89E-05	
B-K-220	02N6-06-A	Bone	AM241	-1.40E-05	+3.00E-05	Bq/g	06/02/05	04/19/05	15	101.4	13	+2.93E-05	
B-K-220	02N6-06-A	Bone	U236	+5.02E-06	+8.14E-06	Bq/g	05/18/05	04/19/05	15	109.5	06	+1.36E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF8ASDG No.: B-K-215

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-221	02N6-07-A	Bone	U234	+2.00E-04	+8.16E-05	Bq/g	05/19/05	04/19/05	15	106.4	01	+3.27E-05	
B-K-221	02N6-07-A	Bone	U235	-1.27E-05	+2.77E-05	Bq/g	05/19/05	04/19/05	15	106.4	01	+3.44E-05	
B-K-221	02N6-07-A	Bone	U238	+2.25E-04	+8.19E-05	Bq/g	05/19/05	04/19/05	15	106.4	01	+4.03E-05	
B-K-221	02N6-07-A	Bone	PU238	-1.39E-05	+1.76E-05	Bq/g	05/18/05	04/19/05	15	85.2	15	+3.00E-05	
B-K-221	02N6-07-A	Bone	PU239/240	+3.11E-06	+5.45E-06	Bq/g	05/18/05	04/19/05	15	85.2	15	+2.51E-05	
B-K-221	02N6-07-A	Bone	AM241	-2.30E-05	+2.11E-05	Bq/g	06/02/05	04/19/05	15	99.6	14	+1.15E-05	
B-K-221	02N6-07-A	Bone	U236	+3.82E-06	+6.71E-06	Bq/g	05/19/05	04/19/05	15	106.4	01	+2.73E-05	
B-K-222	02N6-08-A	Bone	U234	+9.38E-05	+6.72E-05	Bq/g	05/19/05	04/19/05	15	98.1	02	+4.18E-05	
B-K-222	02N6-08-A	Bone	U235	-5.67E-06	+3.21E-05	Bq/g	05/19/05	04/19/05	15	98.1	02	+3.57E-05	
B-K-222	02N6-08-A	Bone	U238	+4.71E-05	+5.26E-05	Bq/g	05/19/05	04/19/05	15	98.1	02	+4.78E-05	
B-K-222	02N6-08-A	Bone	PU238	-1.26E-05	+1.72E-05	Bq/g	05/19/05	04/19/05	15	84.1	09	+2.64E-05	
B-K-222	02N6-08-A	Bone	PU239/240	+3.31E-06	+5.75E-06	Bq/g	05/19/05	04/19/05	15	84.1	09	+2.65E-05	
B-K-222	02N6-08-A	Bone	AM241	-2.08E-05	+2.37E-05	Bq/g	06/02/05	04/19/05	15	95.3	15	+2.71E-05	
B-K-222	02N6-08-A	Bone	U236	+7.93E-06	+1.26E-05	Bq/g	05/19/05	04/19/05	15	98.1	02	+3.39E-05	
B-K-223	02N6-09-A	Bone	U234	+1.81E-04	+7.62E-05	Bq/g	05/19/05	04/19/05	15	105.3	03	+4.16E-05	
B-K-223	02N6-09-A	Bone	U235	-1.66E-05	+2.67E-05	Bq/g	05/19/05	04/19/05	15	105.3	03	+3.96E-05	
B-K-223	02N6-09-A	Bone	U238	+1.53E-04	+6.70E-05	Bq/g	05/19/05	04/19/05	15	105.3	03	+3.71E-05	
B-K-223	02N6-09-A	Bone	PU238	-4.56E-06	+1.98E-05	Bq/g	05/19/05	04/19/05	15	92.7	10	+2.84E-05	
B-K-223	02N6-09-A	Bone	PU239/240	+8.30E-06	+1.31E-05	Bq/g	05/19/05	04/19/05	15	92.7	10	+3.50E-05	
B-K-223	02N6-09-A	Bone	AM241	-1.08E-05	+3.27E-05	Bq/g	06/02/05	04/19/05	15	94.3	16	+2.88E-05	
B-K-223	02N6-09-A	Bone	U236	+1.10E-05	+1.68E-05	Bq/g	05/19/05	04/19/05	15	105.3	03	+2.79E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF8ASDG No.: B-K-215

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-225	02N6-10-A	Bone	U234	+1.92E-04	+3.78E-04	Bq/g	05/19/05	04/19/05	2.26	103.5	04	+1.83E-04	
B-K-225	02N6-10-A	Bone	U235	-7.68E-05	+1.87E-04	Bq/g	05/19/05	04/19/05	2.26	103.5	04	+3.40E-04	
B-K-225	02N6-10-A	Bone	U238	+5.35E-05	+3.01E-04	Bq/g	05/19/05	04/19/05	2.26	103.5	04	+2.91E-04	
B-K-225	02N6-10-A	Bone	PU238	+1.94E-02	+2.28E-03	Bq/g	05/19/05	04/19/05	2.26	94.4	11	+1.88E-04	
B-K-225	02N6-10-A	Bone	PU239/240	+1.28E-02	+1.62E-03	Bq/g	05/19/05	04/19/05	2.26	94.4	11	+2.12E-04	
B-K-225	02N6-10-A	Bone	AM241	+1.43E-02	+1.34E-03	Bq/g	06/02/05	04/19/05	2.26	109.1	07	+2.63E-04	
B-K-225	02N6-10-A	Bone	U236	+2.56E-05	+4.49E-05	Bq/g	05/19/05	04/19/05	2.26	103.5	04	+1.83E-04	

See key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF8ASDG No.: B-K-215

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	U234	+1.63E-03	+5.90E-04	NA	NA	Bq/sp1	NA%	05/19/2005	85.6%	05	+7.35E-04	
REAGENT	BLK	U235	+2.63E-04	+4.00E-04	NA	NA	Bq/sp1	NA%	05/19/2005	85.6%	05	+8.46E-04	
REAGENT	BLK	U238	+1.13E-03	+4.73E-04	NA	NA	Bq/sp1	NA%	05/19/2005	85.6%	05	+4.98E-04	
REAGENT	BLK	PU238	+1.68E-04	+2.56E-04	NA	NA	Bq/sp1	NA%	05/18/2005	56.2%	16	+7.20E-04	
REAGENT	BLK	PU239/240	+5.96E-06	+9.46E-06	NA	NA	Bq/sp1	NA%	05/18/2005	56.2%	16	+1.07E-03	
REAGENT	BLK	AM241	+4.73E-04	+2.69E-04	NA	NA	Bq/sp1	NA%	05/19/2005	55.9%	12	+3.20E-04	
REAGENT	BLK	U236	-2.68E-05	-4.38E-05	NA	NA	Bq/sp1	NA%	05/19/2005	85.6%	05	+4.98E-04	
REAGENT	LCS	U238	+1.99E-01	+2.94E-02	+1.99E-01	NA	Bq/mL	99.6%	05/18/2005	91.8%	08	+1.10E-03	
REAGENT	LCS	PU239/240	+1.65E-01	+2.09E-02	+1.50E-01	NA	Bq/mL	110.0%	05/19/2005	68.5%	08	+2.42E-03	
REAGENT	LCS	AM241	+1.54E-01	+1.32E-02	+1.55E-01	NA	Bq/mL	99.3%	05/19/2005	82.4%	07	+1.57E-03	

See Key for Form II.

Comments:

Project: Alpha Analysis for Amchitka Island (Batch 8A)  
Laboratory: RTC  
Report #: AmchitBatchF8A  
SDG#: B-K-215

### Summary of 2 and 3 sigma activities

Below are the results for U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 8A from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
B-K-221	02N6-07-A	U234	2.00E-04	8.16E-05	2.5
B-K-221	02N6-07-A	U238	2.25E-04	8.19E-05	2.7
B-K-223	02N6-09-A	U234	1.81E-04	7.62E-05	2.4
B-K-223	02N6-09-A	U238	1.53E-04	6.70E-05	2.3
B-K-225	02N6-10-A	AM241	1.43E-02	1.34E-03	10.7
B-K-225	02N6-10-A	PU238	1.94E-02	2.28E-03	8.5
B-K-225	02N6-10-A	PU239/240	1.28E-02	1.62E-03	7.9

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

**BATCH 8B**  
**ALPHA**

06/15/2005

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE

Project Title: Alpha Analysis for Amchitka (Batch 8B)

Lab Name: RTC Case No: NA

Report No.: AmchitBatchF8B Method Type: A/B

Approved SAP No.: NA SDG No.: B-H-224

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>B-H-224</u>	<u>02NE-01-A</u>
<u>B-H-226</u>	<u>02NE-02-A</u>
<u>B-H-230</u>	<u>02NE-06-A</u>
<u>B-H-234</u>	<u>02NE-10-A</u>
<u>B-K-227</u>	<u>02NE-03-A</u>
<u>B-K-228</u>	<u>02NE-04-A</u>
<u>B-K-229</u>	<u>02NE-05-A</u>
<u>B-K-231</u>	<u>02NE-07-A</u>
<u>B-K-232</u>	<u>02NE-08-A</u>
<u>B-K-233 E</u>	<u>02NE-09-A</u>

Comments: All Pages Reviewed by: B.K. Schaefer 6/17/2005

Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature: J. G. Eisenmenger

Title: Technical Leader

Name: J. G. Eisenmenger

Date: 06/15/2005



## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC Case No: NA  
 Report No.: AmchitBatchF8B SDG No.: B-H-224

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-H-224	02NE-01-A	Bone	U234	+6.92E-05	+8.69E-05	Bq/g	05/26/05	04/25/05	15	103.3	02	+3.62E-05	
B-H-224	02NE-01-A	Bone	U235	+1.13E-05	+2.54E-05	Bq/g	05/26/05	04/25/05	15	103.3	02	+3.39E-05	
B-H-224	02NE-01-A	Bone	U238	+5.90E-05	+5.77E-05	Bq/g	05/26/05	04/25/05	15	103.3	02	+3.97E-05	
B-H-224	02NE-01-A	Bone	PU238	+1.17E-05	+3.39E-05	Bq/g	05/26/05	04/25/05	15	54.8	09	+4.06E-05	
B-H-224	02NE-01-A	Bone	PU239/240	-1.20E-05	+1.51E-05	Bq/g	05/26/05	04/25/05	15	54.8	09	+6.00E-05	
B-H-224	02NE-01-A	Bone	AM241	+1.08E-05	+2.34E-05	Bq/g	06/07/05	04/25/05	15	102.7	09	+2.18E-05	
B-H-224	02NE-01-A	Bone	U236	-8.89E-06	+1.56E-05	Bq/g	05/26/05	04/25/05	15	103.3	02	+3.62E-05	
B-H-226	02NE-02-A	Bone	U234	+2.67E-05	+8.33E-05	Bq/g	05/26/05	04/25/05	15	99.1	03	+4.19E-05	
B-H-226	02NE-02-A	Bone	U235	-2.35E-06	+1.93E-05	Bq/g	05/26/05	04/25/05	15	99.1	03	+4.96E-05	
B-H-226	02NE-02-A	Bone	U238	+4.69E-05	+5.45E-05	Bq/g	05/26/05	04/25/05	15	99.1	03	+2.97E-05	
B-H-226	02NE-02-A	Bone	PU238	-8.83E-06	+1.45E-05	Bq/g	05/26/05	04/25/05	15	78.9	10	+3.76E-05	
B-H-226	02NE-02-A	Bone	PU239/240	+1.26E-05	+2.45E-05	Bq/g	05/26/05	04/25/05	15	78.9	10	+5.86E-05	
B-H-226	02NE-02-A	Bone	AM241	+6.79E-06	+2.25E-05	Bq/g	06/07/05	04/25/05	15	106.5	10	+1.09E-05	
B-H-226	02NE-02-A	Bone	U236	-1.37E-05	+1.69E-05	Bq/g	05/26/05	04/25/05	15	99.1	03	+3.34E-05	
B-H-230	02NE-06-A	Bone	U234	+2.39E-04	+1.04E-04	Bq/g	05/26/05	04/25/05	15	104.6	06	+3.66E-05	
B-H-230	02NE-06-A	Bone	U235	+4.76E-05	+3.09E-05	Bq/g	05/26/05	04/25/05	15	104.6	06	+4.62E-05	
B-H-230	02NE-06-A	Bone	U238	+9.83E-05	+6.46E-05	Bq/g	05/26/05	04/25/05	15	104.6	06	+4.85E-05	
B-H-230	02NE-06-A	Bone	PU238	-1.45E-06	+1.92E-05	Bq/g	05/26/05	04/25/05	15	82.7	13	+4.20E-05	
B-H-230	02NE-06-A	Bone	PU239/240	+1.73E-05	+1.29E-05	Bq/g	05/26/05	04/25/05	15	82.7	13	+1.39E-05	
B-H-230	02NE-06-A	Bone	AM241	+6.32E-06	+3.28E-05	Bq/g	06/07/05	04/25/05	15	95.5	14	+2.73E-05	
B-H-230	02NE-06-A	Bone	U236	+7.90E-07	+2.12E-05	Bq/g	05/26/05	04/25/05	15	104.6	06	+1.43E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RTCCase No: NAReport No.: AmchitBatchF8BSDG No.: B-H-224

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-H-234	02NE-10-A	Bone	U234	+1.60E-04	+9.57E-05	Bq/g	06/07/05	04/25/05	15	108.1	04	+4.46E-05	
B-H-234	02NE-10-A	Bone	U235	+5.02E-06	+2.05E-05	Bq/g	06/07/05	04/25/05	15	108.1	04	+6.22E-05	
B-H-234	02NE-10-A	Bone	U238	+1.11E-04	+6.52E-05	Bq/g	06/07/05	04/25/05	15	108.1	04	+3.16E-05	
B-H-234	02NE-10-A	Bone	PU238	-1.57E-05	+1.75E-05	Bq/g	06/07/05	04/25/05	15	39.6	09	+6.73E-05	
B-H-234	02NE-10-A	Bone	PU239/240	+2.04E-05	+3.61E-05	Bq/g	06/07/05	04/25/05	15	39.6	09	+7.59E-05	
B-H-234	02NE-10-A	Bone	AM241	-8.36E-07	+2.16E-05	Bq/g	06/07/05	04/25/05	15	103.0	10	+1.13E-05	
B-H-234	02NE-10-A	Bone	U236	-1.49E-06	+2.02E-05	Bq/g	06/07/05	04/25/05	15	108.1	04	+4.20E-05	
B-K-227	02NE-03-A	Bone	U234	+1.16E-04	+9.04E-05	Bq/g	05/26/05	04/25/05	15	115.7	04	+3.33E-05	
B-K-227	02NE-03-A	Bone	U235	+2.01E-06	+1.92E-05	Bq/g	05/26/05	04/25/05	15	115.7	04	+5.25E-05	
B-K-227	02NE-03-A	Bone	U238	+4.44E-05	+5.50E-05	Bq/g	05/26/05	04/25/05	15	115.7	04	+4.40E-05	
B-K-227	02NE-03-A	Bone	PU238	-3.13E-06	+1.77E-05	Bq/g	05/26/05	04/25/05	15	47.4	11	+4.71E-05	
B-K-227	02NE-03-A	Bone	PU239/240	-1.08E-05	+1.33E-05	Bq/g	05/26/05	04/25/05	15	47.4	11	+6.36E-05	
B-K-227	02NE-03-A	Bone	AM241	+1.45E-05	+2.39E-05	Bq/g	06/07/05	04/25/05	15	93.8	11	+1.25E-05	
B-K-227	02NE-03-A	Bone	U236	-1.24E-05	+1.62E-05	Bq/g	05/26/05	04/25/05	15	115.7	04	+2.95E-05	
B-K-228	02NE-04-A	Bone	U234	+1.77E-05	+5.99E-04	Bq/g	05/26/05	04/25/05	2.01	102.3	07	+1.44E-04	
B-K-228	02NE-04-A	Bone	U235	+5.10E-05	+1.61E-04	Bq/g	05/26/05	04/25/05	2.01	102.3	07	+2.18E-04	
B-K-228	02NE-04-A	Bone	U238	-1.50E-04	+3.29E-04	Bq/g	05/26/05	04/25/05	2.01	102.3	07	+1.73E-04	
B-K-228	02NE-04-A	Bone	PU238	+3.68E-02	+4.25E-03	Bq/g	06/07/05	04/25/05	2.01	109.4	07	+7.10E-05	
B-K-228	02NE-04-A	Bone	PU239/240	+4.61E-02	+5.21E-03	Bq/g	06/07/05	04/25/05	2.01	109.4	07	+7.11E-05	
B-K-228	02NE-04-A	Bone	AM241	+2.66E-02	+2.67E-03	Bq/g	06/07/05	04/25/05	2.01	101.6	08	+5.20E-04	
B-K-228	02NE-04-A	Bone	U236	+3.51E-06	+1.61E-04	Bq/g	05/26/05	04/25/05	2.01	102.3	07	+1.44E-04	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF8BSDG No.: B-H-224

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-229	02NE-05-A	Bone	U234	+7.56E-05	+8.98E-05	Bq/g	05/26/05	04/25/05	15	82.9	05	+5.06E-05	
B-K-229	02NE-05-A	Bone	U235	-3.26E-06	+1.96E-05	Bq/g	05/26/05	04/25/05	15	82.9	05	+6.86E-05	
B-K-229	02NE-05-A	Bone	U238	+1.31E-04	+7.31E-05	Bq/g	05/26/05	04/25/05	15	82.9	05	+4.11E-05	
B-K-229	02NE-05-A	Bone	PU238	+7.23E-06	+2.82E-05	Bq/g	05/26/05	04/25/05	15	70.3	12	+3.21E-05	
B-K-229	02NE-05-A	Bone	PU239/240	-4.75E-07	+6.73E-06	Bq/g	05/26/05	04/25/05	15	70.3	12	+3.85E-05	
B-K-229	02NE-05-A	Bone	AM241	+1.63E-05	+4.15E-05	Bq/g	06/07/05	04/25/05	15	88.8	13	+3.34E-05	
B-K-229	02NE-05-A	Bone	U236	-6.80E-06	+1.63E-05	Bq/g	05/26/05	04/25/05	15	82.9	05	+4.11E-05	
B-K-231	02NE-07-A	Bone	U234	+1.42E-04	+9.32E-05	Bq/g	05/26/05	04/25/05	15	110.9	08	+3.44E-05	
B-K-231	02NE-07-A	Bone	U235	+2.94E-05	+4.12E-05	Bq/g	05/26/05	04/25/05	15	110.9	08	+3.21E-05	
B-K-231	02NE-07-A	Bone	U238	+2.00E-04	+7.86E-05	Bq/g	05/26/05	04/25/05	15	110.9	08	+2.55E-05	
B-K-231	02NE-07-A	Bone	PU238	+6.44E-06	+2.87E-05	Bq/g	06/02/05	04/25/05	15	42.6	03	+6.91E-05	
B-K-231	02NE-07-A	Bone	PU239/240	+5.78E-05	+7.77E-05	Bq/g	06/02/05	04/25/05	15	42.6	03	+6.92E-05	
B-K-231	02NE-07-A	Bone	AM241	+1.10E-05	+2.30E-05	Bq/g	06/07/05	04/25/05	15	102.9	15	+1.10E-05	
B-K-231	02NE-07-A	Bone	U236	-2.60E-06	+1.91E-05	Bq/g	05/26/05	04/25/05	15	110.9	08	+3.05E-05	
B-K-232	02NE-08-A	Bone	U234	+7.90E-05	+8.77E-05	Bq/g	06/07/05	04/25/05	15	103.8	02	+3.61E-05	
B-K-232	02NE-08-A	Bone	U235	-2.54E-06	+1.93E-05	Bq/g	06/07/05	04/25/05	15	103.8	02	+5.35E-05	
B-K-232	02NE-08-A	Bone	U238	+3.68E-05	+5.36E-05	Bq/g	06/07/05	04/25/05	15	103.8	02	+2.67E-05	
B-K-232	02NE-08-A	Bone	PU238	-7.41E-06	+1.49E-05	Bq/g	05/26/05	04/25/05	15	79.7	15	+3.22E-05	
B-K-232	02NE-08-A	Bone	PU239/240	+1.97E-06	+9.27E-06	Bq/g	05/26/05	04/25/05	15	79.7	15	+1.41E-05	
B-K-232	02NE-08-A	Bone	AM241	+1.85E-06	+2.91E-05	Bq/g	06/07/05	04/25/05	15	99.8	16	+2.72E-05	
B-K-232	02NE-08-A	Bone	U236	-1.03E-05	+1.56E-05	Bq/g	06/07/05	04/25/05	15	103.8	02	+3.95E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGELab Name: RICCase No: NAReport No.: AmchitBatchF8BSDG No.: B-H-224

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uner +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-233	02NE-09-A	Bone	U234	+1.63E-04	+9.35E-05	Bq/g	06/07/05	04/25/05	15	111.0	03	+2.99E-05	
B-K-233	02NE-09-A	Bone	U235	-8.12E-06	+2.31E-05	Bq/g	06/07/05	04/25/05	15	111.0	03	+5.44E-05	
B-K-233	02NE-09-A	Bone	U238	+1.02E-04	+6.19E-05	Bq/g	06/07/05	04/25/05	15	111.0	03	+3.74E-05	
B-K-233	02NE-09-A	Bone	PU238	+3.05E-05	+6.10E-05	Bq/g	06/02/05	04/25/05	15	43.5	04	+8.85E-05	
B-K-233	02NE-09-A	Bone	PU239/240	+4.06E-05	+6.31E-05	Bq/g	06/02/05	04/25/05	15	43.5	04	+7.87E-05	
B-K-233	02NE-09-A	Bone	AM241	+7.17E-06	+3.18E-05	Bq/g	06/07/05	04/25/05	15	99.9	09	+2.24E-05	
B-K-233	02NE-09-A	Bone	U236	-1.31E-05	+1.65E-05	Bq/g	06/07/05	04/25/05	15	111.0	03	+4.49E-05	

See key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF8B

Case No: NA  
SDG No.: B-H-224

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	U234	+8.50E-04	+1.16E-03	NA	NA	Bq/sp1	NA%	06/01/2005	50.3%	05	+1.14E-03	
REAGENT	BLK	U235	-1.72E-04	-2.84E-04	NA	NA	Bq/sp1	NA%	06/01/2005	50.3%	05	+1.44E-03	
REAGENT	BLK	U238	+1.06E-03	+5.90E-04	NA	NA	Bq/sp1	NA%	06/01/2005	50.3%	05	+1.01E-03	
REAGENT	BLK	PU238	+1.46E-04	+2.17E-04	NA	NA	Bq/sp1	NA%	06/07/2005	43.8%	10	+3.95E-04	
REAGENT	BLK	PU239/240	+4.87E-05	+7.71E-05	NA	NA	Bq/sp1	NA%	06/07/2005	43.8%	10	+1.27E-03	
REAGENT	BLK	AM241	+2.00E-04	+3.02E-04	NA	NA	Bq/sp1	NA%	06/08/2005	47.7%	12	+8.56E-04	
REAGENT	BLK	U236	+1.46E-04	+2.34E-04	NA	NA	Bq/sp1	NA%	06/01/2005	50.3%	05	+1.25E-03	
REAGENT	LCS	U238	+2.03E-01	+3.22E-02	+1.99E-01	NA	Bq/mL	101.6%	06/07/2005	68.0%	06	+2.12E-03	
REAGENT	LCS	PU239/240	+1.43E-01	+2.00E-02	+1.50E-01	NA	Bq/mL	95.3%	06/07/2005	55.6%	08	+3.52E-03	
REAGENT	LCS	AM241	+1.46E-01	+1.54E-02	+1.55E-01	NA	Bq/mL	94.1%	06/07/2005	74.7%	08	+2.84E-03	

See Key for Form II.

Comments:

Project: Alpha Analysis for Amchitka Island (Batch 8B)  
Laboratory: RTC  
Report #: AmchitBatchF8B  
SDG#: B-K-215

### Summary of 2 and 3 sigma activities

Below are the results for U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 8B from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
B-H-230	02NE-06-A	U234	2.39E-04	1.04E-04	2.3
B-K-228	02NE-04-A	AM241	2.66E-02	2.67E-03	10.0
B-K-228	02NE-04-A	PU238	3.68E-02	4.25E-03	8.7
B-K-228	02NE-04-A	PU239/240	4.61E-02	5.21E-03	8.8
B-K-231	02NE-07-A	U238	2.00E-04	7.86E-05	2.5

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).



## **Appendix A-3**

### **Tc-99 Analysis**



**BATCH 1**  
**Tc-99**

TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Re Mean ng/mL	99Tc % Recovery	Re %Rec	Bq 99Tc/g (wet)	Detection Limit Bq 99Tc/g (wet)	Flag
Ozeo-05-a	S-B-54	14.9469	x	1.792	97.27%	89.6%	5.70E-05	1.20E-04	U
Ozeo-06-a	S-B-55	14.9116	x	0.009	0.41%	0.4%	3.57E-05		
Ozeo-07-a	S-B-56	14.9411	x	1.893	95.32%	94.6%	-2.53E-05	1.10E-04	U
Ozeo-01-a	S-G-50	14.8737	x	0.007	0.39%	0.4%	3.26E-05		
Ozeo-02-a	S-G-51	14.8882	x	1.859	95.98%	93.0%	-2.94E-05	1.30E-04	U
Ozeo-03-a	S-G-52	14.9249	x	0.009	0.61%	0.4%	3.87E-05		
Ozeo-04-a	S-G-53	14.9280	x	2.091	97.17%	104.5%	-3.39E-07	1.04E-04	U
Ozeo-15-a	S-K-70	20.2323	x	0.008	0.43%	0.4%	3.09E-05		
Ozeo-20-a	S-K-75	19.9567	x	2.155	97.48%	107.7%	3.90E-05	1.05E-04	U
Ozeo-08-a	S-L-57	14.4665	x	0.006	0.39%	0.3%	3.11E-05		
Ozeo-09-a	S-L-58	14.8508	x	2.095	96.82%	104.8%	2.24E-05	1.08E-04	U
Ozeo-10-a	S-L-59	14.8506	x	0.009	0.15%	0.4%	3.22E-05		
Ozeo-17-a	S-L-72	14.8722	x	3.010	96.61%	150.5%	2.19E-06	1.11E-04	U
Ozeo-16-a	S-O-71	14.8881	x	0.009	0.38%	0.5%	2.97E-05		
Ozeo-18-a	S-O-73	14.9365	x	1.988	99.27%	99.4%	6.18E-02	4.09E-03	
Ozeo-19-a	S-O-74	14.8918	x	0.010	0.11%	0.5%	1.36E-03		
Ozeo-12-a	S-P-67	14.879	x	1.873	101.06%	93.7%	2.30E-05	8.95E-05	U
Ozeo-13-a	S-P-68	14.9572	x	0.006	0.13%	0.3%	2.66E-05		
			s	1.586	100.48%	79.3%	-2.02E-05	1.52E-04	U
			s	0.010	0.12%	0.5%	4.52E-05		
			s	1.974	100.15%	98.7%	-1.02E-05	1.13E-04	U
			s	0.004	0.58%	0.2%	3.02E-05		
			s	2.104	102.56%	105.2%	-5.85E-06	1.06E-04	U
			s	0.007	0.33%	0.4%	3.15E-05		
			s	2.387	98.06%	119.3%	2.80E-05	1.26E-04	U
			s	0.007	0.09%	0.4%	3.75E-05		
			s	1.398	98.31%	69.9%	2.01E-05	1.55E-04	U
			s	0.004	0.24%	0.2%	4.13E-05		
			s	1.246	97.62%	62.3%	-3.25E-06	1.71E-04	U
			s	0.010	0.61%	0.5%	4.57E-05		
			s	1.259	98.27%	62.9%	-3.90E-06	1.62E-04	U
			s	0.005	0.23%	0.3%	4.80E-05		
			s	1.468	98.09%	73.4%	-2.58E-05	1.38E-04	U
			s	0.005	0.23%	0.3%	4.10E-05		
			s	1.625	98.34%	81.3%	-2.17E-05	1.36E-04	U
			s	0.006	0.09%	0.3%	4.03E-05		

TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Re Mean ng/mL	99Tc % Recovery	Re %Rec	Bq 99Tc/g (wet)	Detection Limit Bq 99Tc/g (wet)	Flag
Ozeo-14-a	S-P-69	14.9423	x 97.33%	1.664		83.2%	-2.02E-05	1.35E-04	U
Ozeo-21-blk	Halibut	15.2574	x 0.33%	0.010		0.5%	4.00E-05		
Ozeo-11-a	S-B-66	14.8759	x 97.69%	1.845		92.3%	9.84E-07	1.16E-04	U
Ozeo-22-blk spk	Halibut	15.1813	x 0.25%	0.006		0.3%	3.09E-05		
			x 92.57%	2.059		103.0%	6.40E-05	1.08E-04	U
			x 0.97%	0.008		0.4%	2.88E-05		
			x 91.68%	2.001	75.8%	100.1%	6.34E-02	4.06E-03	
			x 0.36%	0.005	0.3%		1.29E-03		
Average CCV									
Recovery									
SD									
n									
p									
Mean Blk				0.001					
Stdev Blk				0.000					
n				5					
Estimated DL				0.001					

TRA ID	CRISP ID	Crucible	Crucible g	Sample g	Crucible + Dry g	Crucible + Ash g	Dry g	Ash g	wt % Dry	wt % ash	Ash/Dry
Ozeo-21-bk	Halibut	21	33.0548	15.2574	37.5327	33.3320	4.4779	0.2772	29.3%	1.8%	6.2%
Ozeo-22-bk	Halibut	22	32.7336	15.1813	36.6339	32.9888	3.9003	0.2552	25.7%	1.7%	6.5%
Ozeo-05-a	S-B-54	1	32.0703	14.9469	35.4049	32.3327	3.3346	0.2624	22.3%	1.8%	7.9%
Ozeo-06-a	S-B-55	2	30.5334	14.9116	33.7471	30.7960	3.2137	0.2626	21.6%	1.8%	8.2%
Ozeo-07-a	S-B-56	3	31.3904	14.9411	34.6699	31.6327	3.2795	0.2423	21.9%	1.6%	7.4%
Ozeo-11-a	S-B-66	4	30.0594	14.8759	33.3094	30.3210	3.2500	0.2616	21.8%	1.8%	8.0%
Ozeo-01-a	S-G-50	5	33.1665	14.8737	36.3370	33.3671	3.1705	0.2006	21.3%	1.3%	6.3%
Ozeo-02-a	S-G-51	6	30.9318	14.8882	34.0099	31.1838	3.0781	0.2520	20.7%	1.7%	8.2%
Ozeo-03-a	S-G-52	7	31.6301	14.9249	34.6102	31.8790	2.9801	0.2489	20.0%	1.7%	8.4%
Ozeo-04-a	S-G-53	8	33.1996	14.9280	36.2595	33.4072	3.0599	0.2076	20.5%	1.4%	6.8%
Ozeo-15-a	S-K-70	9	28.5838	20.2323	32.7944	28.8249	4.2106	0.2411	20.8%	1.2%	5.7%
Ozeo-20-a	S-K-75	10	31.5223	19.9567	35.7300	31.7385	4.2077	0.2162	21.1%	1.1%	5.1%
Ozeo-08-a	S-L-57	11	31.2749	14.4665	33.4300	31.4032	2.1551	0.1283	14.9%	0.9%	6.0%
Ozeo-09-a	S-L-58	12	30.1320	14.8508	33.5403	30.3150	3.4083	0.1830	23.0%	1.2%	5.4%
Ozeo-10-a	S-L-59	13	29.1141	14.8506	32.5951	29.3068	3.4810	0.1927	23.4%	1.3%	5.5%
Ozeo-17-a	S-L-72	14	28.7594	14.8722	32.0473	28.9789	3.2879	0.2195	22.1%	1.5%	6.7%
Ozeo-16-a	S-O-71	15	31.5012	14.8881	36.8505	32.0527	5.3493	0.5515	35.9%	3.7%	10.3%
Ozeo-18-a	S-O-73	16	29.5342	14.9365	34.5192	30.1769	4.9850	0.6427	33.4%	4.3%	12.9%
Ozeo-19-a	S-O-74	17	30.9821	14.8918	37.0959	31.5686	6.1138	0.5865	41.1%	3.9%	9.6%
Ozeo-12-a	S-P-67	18	30.2587	14.8790	35.1018	30.7993	4.8431	0.5406	32.5%	3.6%	11.2%
Ozeo-13-a	S-P-68	19	28.5896	14.9572	33.4120	28.9960	4.8224	0.4064	32.2%	2.7%	8.4%
Ozeo-14-a	S-P-69	20	33.5180	14.9423	38.4242	33.8760	4.9062	0.3580	32.8%	2.4%	7.3%

**BATCH 2**  
**Tc-99**

TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery Corrected) pg/mL	99Tc % Rec	185Re %Rec	Re Recovery Corrected Bq Tc99/g (wet)	Re Recovery Corrected Detection Limit Bq Tc99/g (wet)	Flag
OZFQ-01-A	S-M-80-B	14.9202	X	102.52%	19.744	50.7%	1.81E-04	2.19E-04	U
OZFQ-02-A	S-M-81-B	14.9299	S	0.47%	1.217	0.7%	6.96E-05		
OZFQ-03-A	S-M-82-B	14.7870	X	104.73%	13.881	60.8%	1.22E-04	1.82E-04	U
OZFQ-04-A	S-M-83-B	14.8869	S	0.49%	1.588	0.4%	6.08E-05		
OZFQ-05-A	S-M-84-B	14.8752	X	106.98%	15.191	84.0%	6.53E-05	1.33E-04	U
OZFQ-06-A	S-M-85-B	14.9267	S	1.30%	3.053	1.3%	4.24E-05		
OZFQ-07-A	S-M-86-B	14.8382	X	100.43%	15.911	94.6%	4.11E-05	1.18E-04	U
OZFQ-08-A	S-M-87-B	14.8877	S	0.85%	1.775	1.0%	3.76E-05		
OZFQ-12-A	S-K-88-B	19.7552	X	103.30%	9.737	75.3%	6.45E-05	1.50E-04	U
OZFQ-13-A	S-K-89-B	19.9817	S	0.38%	0.705	0.2%	4.77E-05		
OZFQ-09-A	S-K-60-B	14.727	X	103.75%	20.623	61.2%	8.12E-05	1.81E-04	U
OZFQ-10-A	S-K-61-B	14.9118	S	0.75%	2.128	0.7%	5.77E-05		
OZFQ-11-A	S-K-63-B	14.9046	X	105.34%	12.333	73.1%	8.81E-05	1.58E-04	U
OZFQ-14-A	S-K-76-B	14.6009	X	1.31%	0.849	1.0%	4.71E-05		
			S	97.59%	26.274	86.4%	4.10E-05	1.33E-04	U
			S	0.68%	4.938	2.3%	3.95E-05		
			S	100.16%	72.309	103.8%	2.13E-05	8.44E-05	U
			S	0.60%	1.381	0.4%	2.69E-05		
			S	101.83%	60.055	103.2%	3.29E-02	9.15E-03	
			S	1.23%	1.228	1.1%	3.41E-03		
			S	98.66%	134.325	86.9%	4.96E-05	1.34E-04	U
			S	0.69%	1.658	0.3%	3.98E-05		
			S	99.32%	29.325	94.2%	8.55E-05	1.18E-04	U
			S	1.02%	1.006	0.5%	3.75E-05		
			S	98.31%	68.069	96.8%	5.41E-05	1.18E-04	U
			S	0.21%	2.403	0.6%	3.52E-05		
			S	101.16%	374.550	102.8%	7.19E-05	1.19E-04	U
			S	0.21%	5.729	0.7%	3.78E-05		



TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery Corrected) pg/mL	99Tc % Rec	185Re %Rec	Re Recovery Corrected Bq Tc99/g (wet)	Re Recovery Corrected Detection Limit Bq Tc99/g (wet)	Flag
OZFQ-15-A	S-U-77-B	14.4042	X	382.162	101.35%	104.6%	4.36E-05	1.20E-04	U
OZFQ-16-A	S-U-90-B	14.7259	S	4.409	0.51%	1.0%	3.55E-05		
OZFQ-17-A	S-U-96-B	14.6155	X	33.042	99.89%	103.0%	1.66E-05	1.16E-04	U
			S	1.836	0.65%	0.8%	3.44E-05		
			X	119.377	100.35%	104.0%	2.62E-05	1.18E-04	U
			S	3.963	0.58%	1.2%	3.50E-05		
OZFQ-18-A	S-VN-102-B	14.5058	X	217.612	99.85%	92.7%	7.11E-05	1.29E-04	U
			S	1.674	0.15%	0.8%	4.10E-05		
OZFQ-19-A	S-VN-103-B	14.1696	X	6174.944	99.20%	69.5%	6.83E-05	1.75E-04	U
			S	102.936	0.36%	1.2%	5.19E-05		
OZFQ-20-A	S-VN-103-B	14.3538	X	547.220	98.90%	81.3%	3.28E-05	1.49E-04	U
			S	11.884	0.70%	1.1%	4.44E-05		
OZFQ-20-Blk		15.2994	X	14.292	100.02%	92.9%	2.39E-05	1.24E-04	U
			S	0.518	1.04%	0.3%	3.68E-05		
OZFQ-20-Blk Spk		15.1579	X	11.154	99.32%	71.4%	5.99E-02	1.67E-02	
			S	0.530	0.34%	6.7%	6.23E-03		
Average CCV									
Recovery						99.0%			
SD						0.8%			
n						11			
p at						0.0016			
%RSD for all						0.0930			
spiked fish flesh									
samples and n						9.3%			13

TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery Corrected) pg/mL	99Tc % Rec	185Re %Rec	Re Recovery Corrected Bq Tc99/g (wet)	Re Recovery Corrected Detection Limit Bq Tc99/g (wet)	Flag
(90.1% Recovery Overall) Mean Blk Stdev Blk n Estimated DL				0.427 0.326 6 1.099					



TRA ID	CRESP ID	Crucible	Crucible g	Sample g	Crucible + Dry g	Crucible + Ash g	Dry g	Ash g	wt % Dry	wt % ash	Ash/Dry
02FQ-01-A	S-M-80-B	1	29.1258	14.9202	34.3550	29.8456	5.2292	0.7198	35.0%	4.8%	13.8%
02FQ-02-A	S-M-81-B	2	31.5378	14.9299	37.6753	32.2145	6.1375	0.6767	41.1%	4.5%	11.0%
02FQ-03-A	S-M-82-B	3	30.9366	14.7870	34.7724	31.3607	3.8358	0.4241	25.9%	2.9%	11.1%
02FQ-04-A	S-M-83-B	4	29.5446	14.8869	33.8059	29.9054	4.2613	0.3608	28.6%	2.4%	8.5%
02FQ-05-A	S-M-84-B	5	30.9864	14.8752	35.1934	31.3428	4.2070	0.3564	28.3%	2.4%	8.5%
02FQ-06-A	S-M-85-B	6	30.1485	14.9267	34.8811	30.7921	4.7326	0.6436	31.7%	4.3%	13.6%
02FQ-07-A	S-M-86-B	7	30.0676	14.8372	34.7048	30.6717	4.6372	0.6041	31.3%	4.1%	13.0%
02FQ-08-A	S-M-87-B	8	31.2868	14.8877	35.8713	31.7187	4.5845	0.4319	30.8%	2.9%	9.4%
02FQ-09-A	S-K-60-B	9	30.2574	14.7270	33.0346	30.5051	2.7772	0.2477	18.9%	1.7%	8.9%
02FQ-10-A	S-K-61-B	10	30.5398	14.9118	33.5451	30.8547	3.0053	0.3149	20.2%	2.1%	10.5%
02FQ-11-A	S-K-63-B	11	28.7686	14.9046	31.3650	28.9862	2.5964	0.2176	17.4%	1.5%	8.4%
02FQ-12-A	S-K-88-B	12	31.6443	19.7552	34.8291	31.8169	3.1848	0.1726	16.1%	0.9%	5.4%
02FQ-13-A	S-K-89-B	13	33.5173	19.9817	36.5723	33.6974	3.0550	0.1801	15.3%	0.9%	5.9%
02FQ-14-A	S-U-76-B	14	28.5863	14.6009	30.6440	29.2349	2.0577	0.6486	14.1%	4.4%	31.5%
02FQ-15-A	S-U-77-B	15	29.4872	14.4042	30.9312	30.1271	1.4440	0.6399	10.0%	4.4%	44.3%
02FQ-16-A	S-U-90-B	16	32.0794	14.7259	33.0432	32.5099	0.9638	0.4305	6.5%	2.9%	44.7%
02FQ-17-A	S-U-96-B	17	31.3924	14.6155	32.5661	31.9094	1.1737	0.5170	8.0%	3.5%	44.0%
02FQ-18-A	S-VN-102-B	18	33.2068	14.5058	41.9114	33.5632	8.7046	0.3564	60.0%	2.5%	4.1%
02FQ-19-A	S-VN-103-B	19	28.5923	14.1696	36.5989	29.0324	8.0066	0.4401	56.5%	3.1%	5.5%
02FQ-20-A	S-VN-104-B	20	33.1676	14.3538	39.0359	33.4998	5.8683	0.3322	40.9%	2.3%	5.7%
02FQ-Blk		21	33.0584	15.2994	37.0324	33.3828	3.9740	0.3244	26.0%	2.1%	8.2%
02FQ-Blk Spike		22	32.7345	15.1579	36.7700	33.0855	4.0355	0.3510	26.6%	2.3%	8.7%

**BATCH 3**  
**Tc-99**

TRA ID	CRESP ID	Wet Mass (g)	Run	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery corrected pg/mL	99Tc % Rec	185Re %Rec	Bq Tc99/g (wet)	Detection Limit Bq Tc99/g (wet)	Flag
02GN-20-Blk Halibut		14.9854	x	105.41%	22.5		89.2%	4.42E-05	1.01E-04	U
			s	1.12%	0.4		0.5%	2.23E-05		
02GN-20-Spike Halibut		15.5953	x	103.47%	21.0	92.1%	86.3%	7.51E-02	1.79E-02	
			s	1.31%	0.6	8.6%	0.5%	6.99E-03		
02GN-11-A	S-K-116-B	14.9096	x	102.59%	29.3		92.8%	1.90E-05	5.07E-05	U
02GN-12-A	S-R-117-B	13.1507	s	1.57%	0.4		0.2%	1.51E-05		
			x	101.90%	351.6		94.9%	1.75E-05	5.33E-05	U
02GN-17-A	S-K-118-B	14.9139	s	1.22%	1.1		0.9%	1.42E-05		
			x	102.22%	182.4		87.8%	3.21E-05	6.89E-05	U
02GN-18-A	S-R-119-B	14.8897	s	1.38%	2.0		0.1%	1.84E-05		
			x	101.99%	824.9		94.7%	1.23E-06	4.62E-05	U
02GN-19-A	S-R-121-B	14.8926	s	1.28%	3.0		0.5%	1.23E-05		
			x	101.31%	833.1		96.6%	1.20E-06	4.83E-05	U
02FQ-Blk Kelp		5.9070	s	1.33%	2.0		0.3%	1.29E-05		
			x	103.83%	70.0		98.6%	8.84E-05	1.65E-04	U
02FQ-Blk Spike Kelp		5.2241	s	1.15%	0.9		0.5%	4.40E-05		
			x	102.47%	72.8	95.0%	98.3%	2.31E-01	5.50E-02	
			s	0.53%	0.6	8.8%	1.0%	2.15E-02		
02GN-01-A	K-AA-105-B	11.7698	x	103.62%	567.0		99.4%	6.86E-06	5.74E-05	U
			s	1.49%	9.1		0.5%	1.53E-05		
02GN-02-A	K-AA-106-B	11.9143	x	103.79%	1305.0		100.0%	1.31E-05	7.06E-05	U
			s	1.14%	3.4		0.4%	1.88E-05		
02GN-03-A	K-BB-107-B	11.9186	x	104.64%	6537.1		103.5%	6.74E-06	6.91E-05	U
			s	0.92%	53.0		0.6%	1.84E-05		
02GN-04-A	K-BB-108-B	11.9158	x	102.50%	14432.9		107.5%	1.62E-05	5.85E-05	U
			s	0.83%	87.7		0.4%	1.56E-05		
02GN-05-A	K-BB-109-B	11.9032	x	1.022	3636.7		101.9%	1.04E-05	1.14E-04	U

TRA ID	CRESP ID	Wet Mass (g)	Run	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery corrected pg/mL	99Tc % Rec	185Re %Rec	Bq Tc99/g (wet)	Detection Limit Bq Tc99/g (wet)	Flag
02GN-06-A	K-BB-110-B	11.9294	x	103.36%	5793.9	1.3%	101.0%	2.51E-05	1.18E-04	U
02GN-07-A	K-AA-111-B	11.8130	x	103.89%	1027.2	1.4%	99.6%	-1.72E-06	2.59E-05	U
02GN-08-A	K-AA-112-B	11.8104	x	104.00%	1346.0	0.4%	99.6%	2.59E-05	2.58E-04	U
02GN-09-A	K-CC-113-B	11.9304	x	103.95%	13349.5	0.5%	98.7%	4.53E-05	7.67E-05	U
02GN-10-A	K-CC-114-B	11.8800	x	105.80%	8511.3	1.8%	103.1%	3.71E-05	5.88E-05	U
02GN-13-A	K-CC-115-B	11.9469	x	106.56%	15906.1	105.6%	105.6%	2.20E-05	5.95E-05	U
02GN-14-A	K-CC-130-B	11.8410	x	104.58%	11793.8	2.6%	105.3%	1.75E-05	7.70E-05	U
02GN-15-A	K-CC-132-B	10.3032	x	104.28%	9703.7	2.7%	104.6%	3.57E-05	7.09E-05	U
02GN-16-A	K-CC-133-C	9.8769	x	105.18%	9745.9	1.9%	103.0%	2.05E-05	2.06E-02	J
Average CCV Recovery				1.02%	65.2	99.3%	98.7%	8.72E-02	7.24E-05	
SD				0.92%	96.1	2.0%	1.7%	7.96E-03		
n						8	8	1.49E-04		
								2.57E-05		

TRA ID	CRESP ID	Wet Mass (g)	Run	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery corrected pg/mL	99Tc % Rec	185Re %Rec	Bq Tc99/g (wet)	Detection Limit Bq Tc99/g (wet)	Flag
p at						0.3351 No bias	0.0654 No bias			
%RSD for all laboratory spiked fish flesh and help samples and n (92.9% Recovery Overall) Mean Blk Stdev Blk n Estimated DL					1.2 1.4 4 6.5	8.9%	16			



**BATCH 6**  
**Tc-99**



TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery corrected) pg/mL	99Tc % Rec	185Re % Rec	Re Recovery Corrected Bq Tc99/g (wet)	Re Recovery Corrected Detection Limit Bq Tc99/g (wet)	Flag
02JL-Blk-Halibut		15.4637	X	34.026		86.3%	2.28E-05	1.79E-04	U
02JL-Blk-Halibut Spike		15.8043	X	0.498		0.2%	4.79E-05		
02JL-01-A	S-J-169B	14.9297	X	33.254	93.0%	88.8%	7.49E-02	1.91E-02	
02JL-02-A	S-C-170B	14.9186	X	0.627	9.0%	0.2%	7.26E-03		
02JL-03-A	S-A-175B	14.9094	X	107.327		87.8%	9.73E-06	2.17E-04	U
02JL-04-A	S-C-176B	14.9202	X	1.009		0.1%	5.79E-05		
02JL-05-A	S-J-177B	14.9415	X	74.729		92.6%	1.61E-05	2.03E-04	U
02JL-06-A	S-A-178B	14.9285	X	0.940		0.2%	4.47E-05		
02JL-07-A	S-K-180B	20.1017	X	33.671		87.6%	-8.56E-06	1.79E-04	U
02JL-08-A	S-K-181B	20.7965	X	0.554		0.5%	4.77E-05	2.44E-04	U
			X	59.349		88.6%	-1.46E-05		
			X	0.740		0.4%	6.51E-05	3.64E-04	U
			X	46.120		88.7%	-9.39E-06		
			X	0.641		0.5%	8.01E-05	2.71E-04	U
			X	44.446		69.8%	-2.04E-05		
			X	0.638		0.2%	7.24E-05		
			X	73.979		86.2%	5.10E-02	1.30E-02	
			X	1.850		0.4%	4.94E-03		
			X	115.524		88.8%	1.49E-01	3.81E-02	
			X	1.176		0.7%	1.45E-02		
			X	0.049					
			X	0.018					
Average CCV Recovery									
SD					99.5%	99.0%			
n					0.8%	0.9%			
p at					6	6			
%RSD for all laboratory/blind spiked fish flesh and n (90.5% Recovery Overall)					0.1399	0.0367			
					No bias	No bias			
					8.7%	15			



TRA ID	CRESP ID	Wet Mass (g)	115In % Rec	Natural Re Estimated From Re187 (185Re Recovery corrected) pg/mL	99Tc % Rec	185Re %Rec	Re Recovery Corrected Bq Tc99/g (wet)	Re Recovery Corrected Detection Limit Bq Tc99/g (wet)	Flag
Mean Blk				0.075					
Stdev Blk				0.030					
n				4					
Estimated DL				0.136					

TRA ID	CRESP ID	Crucible	Crucible g	Sample g	Crucible + Dry g	Crucible + Ash g	Dry g	Ash g	wt % Dry	wt % ash	Ash/Dry
02JL-01-A	S-J-169B	1	31.4122	14.9297	35.9656	31.5810	4.5534	0.1688	30.5%	1.1%	3.7%
02JL-02-A	S-C-170B.	2	30.6867	14.9186	33.6781	30.8673	2.9914	0.1806	20.1%	1.2%	6.0%
02JL-03-A	S-A-175B	3	32.3722	14.9094	35.6257	32.6268	3.2535	0.2546	21.8%	1.7%	7.8%
02JL-04-A	S-C-176B	4	33.5721	14.9202	36.3114	33.7470	2.7393	0.1749	18.4%	1.2%	6.4%
02JL-05-A	S-J-177B	5	30.8657	14.9415	34.5290	31.0527	3.6633	0.1870	24.5%	1.3%	5.1%
02JL-06-A	S-A-178B	6	30.8270	14.9285	35.0419	31.1482	4.2149	0.3212	28.2%	2.2%	7.6%
02JL-07-A	S-K-180B	7	31.2955	20.1017	34.4617	31.4562	3.1662	0.1607	15.8%	0.8%	5.1%
02JL-08-A	S-K-181B	8	31.6578	20.7965	35.9524	31.8890	4.2946	0.2312	20.7%	1.1%	5.4%
02JL-Blk-Halibut		9	31.2793	15.4637	35.9428	31.4733	4.6635	0.1940	30.2%	1.3%	4.2%
02JL-Blk-Halibut Spike		10	31.0549	15.8043	35.5546	31.2530	4.4997	0.1981	28.5%	1.3%	4.4%



## **Appendix B**

### **Results of Performance Evaluation Standards And Blind QC Samples**

## **Results of Performance Evaluation Standards**

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM1	AM1FS10A4GA-1	Co-57	BLANK	2.09 +/- 0.15 E1 pCi/Tot		NO
AM1	AM1FS10A4GA-1	Co-60	6.97 +/- 0.09 E1 pCi	7.2 +/- 0.4 E1 pCi/Tot	1.03 +/- 0.06	False Pos. YES
AM1	AM1FS10A4GA-1	Cs-134	BLANK	-2. +/- 3.3 E0 pCi/Tot		YES
AM1	AM1FS10A4GA-1	Cs-137	6.02 +/- 0.08 E1 pCi	6.0 +/- 0.4 E1 pCi/Tot	1.00 +/- 0.07	YES
AM1	AM1FS10A4GA-1	Eu-152	6.14 +/- 0.06 E1 pCi	6.2 +/- 0.3 E1 pCi/Tot	1.01 +/- 0.05	YES
AM1	AM1FS10A4GA-1	I-129	1.024 +/- 0.010 E2 pCi	3.8 +/- 3.1 E1 pCi/Tot	0.37 +/- 0.30	NO
AM1	AM1FS10A4GA-1	Mn-54	BLANK	3 +/- 24 E-1 pCi/Tot		Non-detect. YES
AM1	AM1FS10A4GA-1	Sr-90	9.99 +/- 0.14 E1 pCi	9.1 +/- 0.4 E1 pCi/Tot	0.91 +/- 0.04	YES
AM1	AM1FS10A4GA-1	Zn-65	BLANK	1 +/- 400 E-2 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM11	AM3KL10A4GA-1	Co-57	6.6 +/- 0.2 E1 pCi	9.1 +/- 0.7 E1 pCi/Tot	1.37 +/- 0.12	WARNING
AM11	AM3KL10A4GA-1	Co-60	9.49 +/- 0.16 E1 pCi	8.7 +/- 0.8 E1 pCi/Tot	0.92 +/- 0.09	3.1sig YES
AM11	AM3KL10A4GA-1	Cs-134	1.05 +/- 0.02 E2 pCi	9.5 +/- 0.4 E1 pCi/Tot	0.90 +/- 0.04	YES
AM11	AM3KL10A4GA-1	Cs-137	8.37 +/- 0.19 E1 pCi	7.8 +/- 0.8 E1 pCi/Tot	0.93 +/- 0.10	YES
AM11	AM3KL10A4GA-1	Eu-152	7.37 +/- 0.08 E1 pCi	7.3 +/- 0.9 E1 pCi/Tot	0.99 +/- 0.12	YES
AM11	AM3KL10A4GA-1	Mn-54	8.72 +/- 0.12 E1 pCi	8.6 +/- 0.8 E1 pCi/Tot	0.99 +/- 0.09	YES
AM11	AM3KL10A4GA-1	Zn-65	1.05 +/- 0.02 E2 pCi	1.03 +/- 0.11 E2 pCi/Tot	0.97 +/- 0.11	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM13	AM5KL10A4GA-1	Co-57	BLANK	5 +/- 2 E0 pCi/Tot		YES
AM13	AM5KL10A4GA-1	Co-60	1.395 +/- 0.019 E1 pCi	1.5 +/- 0.3 E1 pCi/Tot	1.08 +/- 0.22	YES
AM13	AM5KL10A4GA-1	Cs-134	BLANK	0 +/- 3 E0 pCi/Tot		YES
AM13	AM5KL10A4GA-1	Cs-137	1.204 +/- 0.017 E1 pCi	1.8 +/- 0.4 E1 pCi/Tot	1.49 +/- 0.33	YES
AM13	AM5KL10A4GA-1	Eu-152	1.228 +/- 0.013 E1 pCi	1.0 +/- 0.8 E1 pCi/Tot	0.81 +/- 0.65	NO
AM13	AM5KL10A4GA-1	Mn-54	BLANK	0 +/- 2.6 E0 pCi/Tot		Non-detect. YES
AM13	AM5KL10A4GA-1	Zn-65	BLANK	1 +/- 4 E0 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %



Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM15	AM1KL10A4AL-1	Am-241	1.99 +/- 0.02 E0 pCi	1.8 +/- 0.2 E0 pCi/Tot	0.90 +/- 0.10	YES
AM15	AM1KL10A4AL-1	Pu-238	BLANK	1 +/- 1 E-2 pCi/Tot		YES
AM15	AM1KL10A4AL-1	Pu-239	2.85 +/- 0.03 E0 pCi	3.1 +/- 0.3 E0 pCi/Tot	1.09 +/- 0.11	YES
AM15	AM1KL10A4AL-1	Sr-90	6.44 +/- 0.09 E0 pCi	6.1 +/- 0.4 E0 pCi/Tot	0.95 +/- 0.06	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM17	AM3KL10A4AL-1	Am-241	1.99 +/- 0.02 E0 pCi	1.9 +/- 0.2 E0 pCi/Tot	0.95 +/- 0.10	YES
AM17	AM3KL10A4AL-1	Pu-238	2.39 +/- 0.03 E0 pCi	2.5 +/- 0.3 E0 pCi/Tot	1.04 +/- 0.13	YES
AM17	AM3KL10A4AL-1	Pu-239	1.510 +/- 0.018 E0 pCi	1.53 +/- 0.19 E0 pCi/Tot	1.01 +/- 0.13	YES
AM17	AM3KL10A4AL-1	Sr-90	3.02 +/- 0.04 E0 pCi	2.9 +/- 0.3 E0 pCi/Tot	0.96 +/- 0.10	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM19	AM5KL10A4AL-1	Am-241	1.48 +/- 0.02 E0 pCi	1.40 +/- 0.15 E0 pCi/Tot	0.95 +/- 0.10	YES
AM19	AM5KL10A4AL-1	Pu-238	2.24 +/- 0.02 E0 pCi	2.4 +/- 0.2 E0 pCi/Tot	1.07 +/- 0.09	YES
AM19	AM5KL10A4AL-1	Pu-239	2.56 +/- 0.03 E0 pCi	2.7 +/- 0.3 E0 pCi/Tot	1.05 +/- 0.12	YES
AM19	AM5KL10A4AL-1	Sr-90	BLANK	2 +/- 2.4 E-1 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM21	AM1KL10A4TC-1	Tc-99	3.85 +/- 0.06 E1 pCi	3.5 +/- 0.3 E1 pCi/Tot	0.91 +/- 0.08	YES
AM21	AM1KL10A4TC-2	Tc-99	9.63 +/- 0.16 E1 pCi	8.9 +/- 0.8 E1 pCi/Tot	0.92 +/- 0.08	YES
AM21	AM1KL10A4TC-3	Tc-99	2.40 +/- 0.04 E1 pCi	2.1 +/- 0.2 E1 pCi/Tot	0.87 +/- 0.08	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM29	AM1BN10A4AL-1	Am-241	BLANK	1 +/- 1 E-2 pCi/Tot		YES
AM29	AM1BN10A4AL-1	Pu-238	1.44 +/- 0.02 E0 pCi	1.46 +/- 0.18 E0 pCi/Tot	1.01 +/- 0.13	YES
AM29	AM1BN10A4AL-1	Pu-239	1.193 +/- 0.015 E0 pCi	1.22 +/- 0.15 E0 pCi/Tot	1.02 +/- 0.13	YES
AM29	AM1BN10A4AL-1	Sr-90	5.58 +/- 0.07 E0 pCi	5.0 +/- 0.3 E0 pCi/Tot	0.90 +/- 0.06	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM3	AM3FS10A4GA-1	Co-57	4.15 +/- 0.17 E1 pCi	5.3 +/- 0.2 E1 pCi/Tot	1.28 +/- 0.07	WARNING
AM3	AM3FS10A4GA-1	Co-60	5.93 +/- 0.10 E1 pCi	6.4 +/- 0.4 E1 pCi/Tot	1.08 +/- 0.07	3.8sig YES
AM3	AM3FS10A4GA-1	Cs-134	6.61 +/- 0.14 E1 pCi	6.6 +/- 0.3 E1 pCi/Tot	1.00 +/- 0.05	YES
AM3	AM3FS10A4GA-1	Cs-137	5.23 +/- 0.11 E1 pCi	5.2 +/- 0.4 E1 pCi/Tot	0.99 +/- 0.08	YES
AM3	AM3FS10A4GA-1	Eu-152	3.07 +/- 0.03 E1 pCi	3.5 +/- 0.7 E1 pCi/Tot	1.14 +/- 0.23	YES
AM3	AM3FS10A4GA-1	I-129	8.19 +/- 0.08 E1 pCi	4.2 +/- 2.9 E1 pCi/Tot	0.51 +/- 0.35	NO
AM3	AM3FS10A4GA-1	Mn-54	5.45 +/- 0.08 E1 pCi	7.2 +/- 0.4 E1 pCi/Tot	1.32 +/- 0.08	Non-defect. WARNING
AM3	AM3FS10A4GA-1	Sr-90	2.23 +/- 0.03 E1 pCi	2.14 +/- 0.11 E1 pCi/Tot	0.96 +/- 0.05	4.2sig YES
AM3	AM3FS10A4GA-1	Zn-65	6.61 +/- 0.15 E1 pCi	8.0 +/- 0.8 E1 pCi/Tot	1.21 +/- 0.12	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM31	AM3BN10A4AL-1	Am-241	2.42 +/- 0.03 E0 pCi	2.1 +/- 0.2 E0 pCi/Tot	0.87 +/- 0.08	YES
AM31	AM3BN10A4AL-1	Pu-238	1.42 +/- 0.02 E0 pCi	1.37 +/- 0.17 E0 pCi/Tot	0.96 +/- 0.12	YES
AM31	AM3BN10A4AL-1	Pu-239	BLANK	0.00 +/- 0.02 E0 pCi/Tot		YES
AM31	AM3BN10A4AL-1	Sr-90	9.83 +/- 0.13 E0 pCi	1.02 +/- 0.06 E1 pCi/Tot	1.04 +/- 0.06	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM33	AM5BN10A4AL-1	Am-241	1.59 +/- 0.02 E0 pCi	1.57 +/- 0.17 E0 pCi/Tot	0.99 +/- 0.11	YES
AM33	AM5BN10A4AL-1	Pu-238	BLANK	1 +/- 1 E-2 pCi/Tot		YES
AM33	AM5BN10A4AL-1	Pu-239	2.28 +/- 0.03 E0 pCi	2.3 +/- 0.2 E0 pCi/Tot	1.01 +/- 0.09	YES
AM33	AM5BN10A4AL-1	Sr-90	5.15 +/- 0.07 E0 pCi	4.9 +/- 0.4 E0 pCi/Tot	0.95 +/- 0.08	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %



Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM35	AM7FS10A4GA-1	Co-57	BLANK	1 +/- 1.2 E0 pCi/Tot		YES
AM35	AM7FS10A4GA-1	Co-60	BLANK	3.5 +/- 2.8 E0 pCi/Tot		YES
AM35	AM7FS10A4GA-1	Cs-134	BLANK	4.1 +/- 134 E-1 pCi/Tot		YES
AM35	AM7FS10A4GA-1	Cs-137	BLANK	3.6 +/- 27 E0 pCi/Tot		YES
AM35	AM7FS10A4GA-1	Eu-152	BLANK	-3.5 +/- 33 E0 pCi/Tot		YES
AM35	AM7FS10A4GA-1	I-129	9.21 +/- 0.09 E1 pCi	9.4 +/- 1.2 E1 pCi/Tot	1.02 +/- 0.13	YES
AM35	AM7FS10A4GA-1	Mn-54	BLANK	2.4 +/- 2.5 E0 pCi/Tot		YES
AM35	AM7FS10A4GA-1	Zn-65	BLANK	-1. +/- 4.2 E0 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM36	AM3FS10A4TC-1	Tc-99	9.61 +/- 0.15 E0 pCi	8.7 +/- 0.8 E0 pCi/Tot	0.90 +/- 0.08	YES
AM36	AM3FS10A4TC-2	Tc-99	3.36 +/- 0.05 E1 pCi	2.7 +/- 0.2 E1 pCi/Tot	0.80 +/- 0.06	WARNING
AM36	AM3FS10A4TC-3	Tc-99	2.40 +/- 0.03 E1 pCi	2.1 +/- 0.2 E1 pCi/Tot	0.87 +/- 0.08	3.3sig YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/15/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM5	AM5FS10A4GA-1	Co-57	BLANK	3 +/- 10 E-1 pCi/Tot		YES
AM5	AM5FS10A4GA-1	Co-60	BLANK	2.4 +/- 2.8 E0 pCi/Tot		YES
AM5	AM5FS10A4GA-1	Cs-134	BLANK	-1.2 +/- 26 E-1 pCi/Tot		YES
AM5	AM5FS10A4GA-1	Cs-137	BLANK	8.6 +/- 40 E-1 pCi/Tot		YES
AM5	AM5FS10A4GA-1	Eu-152	BLANK	-2. +/- 7.2 E1 pCi/Tot		YES
AM5	AM5FS10A4GA-1	I-129	5.12 +/- 0.05 E1 pCi	3.4 +/- 0.3 E1 pCi/Tot	0.66 +/- 0.06	WARNING
AM5	AM5FS10A4GA-1	Mn-54	BLANK	6.7 +/- 24 E-1 pCi/Tot		5.7sig YES
AM5	AM5FS10A4GA-1	Sr-90	BLANK	3.2 +/- 2.7 E-1 pCi/Tot		YES
AM5	AM5FS10A4GA-1	Zn-65	BLANK	-5. +/- 3.9 E0 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM7	AM1FS10A4TC-1	Tc-99	4.81 +/- 0.08 E1 pCi	4.1 +/- 0.2 E1 pCi/Tot	0.85 +/- 0.04	WARNING
AM7	AM1FS10A4TC-2	Tc-99	3.85 +/- 0.06 E1 pCi	3.58 +/- 0.18 E1 pCi/Tot	0.93 +/- 0.05	3.4sig YES
AM7	AM1FS10A4TC-3	Tc-99	2.40 +/- 0.04 E1 pCi	2.21 +/- 0.11 E1 pCi/Tot	0.92 +/- 0.05	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM9	AM1KL10A4GA-1	Co-57	BLANK	4.5 +/- 10 E0 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Co-60	BLANK	-1. +/- 2.8 E0 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Cs-134	BLANK	-1. +/- 2.7 E0 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Cs-137	BLANK	4.8 +/- 3.7 E0 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Eu-152	BLANK	-2.9 +/- 6 E0 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Mn-54	BLANK	1 +/- 23 E-1 pCi/Tot		YES
AM9	AM1KL10A4GA-1	Zn-65	BLANK	-2. +/- 3.6 E0 pCi/Tot		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 11/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

### **Results of Blind QC Samples**

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM37	AM1FS1004GA-14	Co-60	BLANK	-1. +/- 2.7 E0 pCi		YES
AM37	AM1FS1004GA-15	Co-60	4.14 +/- 0.05 E1 pCi	2.9 +/- 0.4 E1 pCi	0.70 +/- 0.10	WARNING
AM37	AM1FS1004GA-15	Cs-137	3.60 +/- 0.05 E1 pCi	2.7 +/- 0.4 E1 pCi	0.75 +/- 0.11	3.1sig YES
AM37	AM1FS1004GA-14	Cs-137	BLANK	-1. +/- 0.7 E1 pCi	*	YES
AM37	AM1FS1004GA-14	Eu-152	BLANK	-1. +/- 6.4 E0 pCi		YES
AM37	AM1FS1004GA-15	Eu-152	BLANK	-3. +/- 6.9 E0 pCi		YES
AM37	AM1FS1004GA-14	I-129	BLANK	1.1 +/- 3.4 E0 pCi		YES
AM37	AM1FS1004GA-15	I-129	BLANK	-4. +/- 3.2 E0 pCi		YES
AM37	AM1FS1004GA-10	Sr-90	BLANK	4.7 +/- 18 E-2 pCi		YES
AM37	AM1FS1004GA-15	Sr-90	5.98 +/- 0.08 E1 pCi	5.35 +/- 0.16 E1 pCi	0.89 +/- 0.03	WARNING
AM37	AM1FS1004GA-14	Sr-90	BLANK	-1. +/- 1.9 E-1 pCi		3.6sig YES
AM37	AM1FS1004GA-11	Sr-90	BLANK	1.3 +/- 1.7 E-1 pCi		YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM39	AM1FS1004TC-12	Tc-99	2.88 +/- 0.04 E1 pCi	2.7 +/- 0.2 E1 pCi	0.94 +/- 0.07	YES
AM39	AM1FS1004TC-13	Tc-99	BLANK	1.1 +/- 1.4 E-2 pCi		YES
AM39	AM1FS1004TC-14	Tc-99	3.84 +/- 0.06 E1 pCi	3.3 +/- 0.3 E1 pCi	0.86 +/- 0.08	YES
AM39	AM1FS1004TC-15	Tc-99	BLANK	1.2 +/- 1.4 E-2 pCi		YES
AM39	AM1FS1004TC-8	Tc-99	8.65 +/- 0.13 E1 pCi	8.3 +/- 0.8 E1 pCi	0.96 +/- 0.09	YES
AM39	AM1FS1004TC-11	Tc-99	2.40 +/- 0.03 E1 pCi	1.78 +/- 0.18 E1 pCi	0.74 +/- 0.08	WARNING 3.4sig

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %



Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM41	AM1KL1004GA-10	Co-60	1.380 +/- 0.018 E1 pCi	8.9 +/- 2.5 E0 pCi	0.64 +/- 0.18	YES
AM41	AM1KL1004GA-1	Co-60	1.104 +/- 0.015 E1 pCi	6 +/- 3.6 E0 pCi	0.54 +/- 0.33	Non-detect.
AM41	AM1KL1004GA-10	Cs-137	1.202 +/- 0.017 E1 pCi	1.3 +/- 0.3 E1 pCi	1.08 +/- 0.25	YES
AM41	AM1KL1004GA-1	Cs-137	9.61 +/- 0.13 E0 pCi	7.5 +/- 3.6 E0 pCi	0.78 +/- 0.37	YES
AM41	AM1KL1004GA-1	Eu-152	BLANK	1.7 +/- 6.7 E0 pCi		YES
AM41	AM1KL1004GA-10	Eu-152	9.17 +/- 0.10 E0 pCi	8 +/- 4.9 E0 pCi	0.87 +/- 0.53	Non-detect.
AM41	AM1KL1004GA-10	I-129	2.01 +/- 0.019 E1 pCi	1.59 +/- 0.11 E1 pCi	0.79 +/- 0.06	WARNING
AM41	AM1KL1004GA-1	I-129	BLANK	1.2 +/- 4.5 E0 pCi		3.8sig YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM43	AM1KL1004TC-2	Tc-99	2.88 +/- 0.04 E1 pCi	2.4 +/- 0.2 E1 pCi	0.83 +/- 0.07	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM49	AM5KL1004AL-2	Am-241	2.82 +/- 0.03 E0 pCi	2.5 +/- 0.2 E0 pCi	0.88 +/- 0.07	YES
AM49	AM5KL1004AL-2	Pu-238	1.66 +/- 0.02 E0 pCi	1.68 +/- 0.19 E0 pCi	1.01 +/- 0.12	YES
AM49	AM5KL1004AL-2	Pu-239	BLANK	1.1 +/- 0.6 E-2 pCi		YES
AM49	AM5KL1004AL-2	Sr-90	1.145 +/- 0.016 E1 pCi	1.11 +/- 0.06 E1 pCi	0.97 +/- 0.05	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM51	AM7KL1004AL-2	Am-241	7.96 +/- 0.11 E-1 pCi	7.6 +/- 0.8 E-1 pCi	0.95 +/- 0.10	YES
AM51	AM7KL1004AL-2	Pu-238	BLANK	1.0 +/- 0.5 E-2 pCi		YES
AM51	AM7KL1004AL-2	Pu-239	1.140 +/- 0.015 E0 pCi	1.09 +/- 0.13 E0 pCi	0.96 +/- 0.11	YES
AM51	AM7KL1004AL-2	Sr-90	2.57 +/- 0.03 E0 pCi	2.9 +/- 0.2 E0 pCi	1.13 +/- 0.08	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM53	AM9KL1004AL-1	Am-241	2.39 +/- 0.03 E0 pCi	2.21 +/- 0.19 E0 pCi	0.92 +/- 0.08	YES
AM53	AM9KL1004AL-1	Pu-238	2.87 +/- 0.04 E0 pCi	2.8 +/- 0.2 E0 pCi	0.97 +/- 0.07	YES
AM53	AM9KL1004AL-1	Pu-239	1.81 +/- 0.02 E0 pCi	1.77 +/- 0.19 E0 pCi	0.98 +/- 0.11	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM55	AM11KL1004AL-2	Am-241	8.88 +/- 0.12 E-1 pCi	8.5 +/- 0.9 E-1 pCi	0.96 +/- 0.10	YES
AM55	AM11KL1004AL-2	Pu-238	1.347 +/- 0.017 E0 pCi	1.28 +/- 0.15 E0 pCi	0.95 +/- 0.11	YES
AM55	AM11KL1004AL-2	Pu-239	1.53 +/- 0.02 E0 pCi	1.50 +/- 0.17 E0 pCi	0.97 +/- 0.11	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM57	AM1BN1004GA-13	Co-60	5.52 +/- 0.07 E1 pCi	5.8 +/- 0.4 E1 pCi	1.05 +/- 0.07	YES
AM57	AM1BN1004GA-13	Cs-137	4.80 +/- 0.06 E1 pCi	5.2 +/- 0.5 E1 pCi	1.08 +/- 0.11	YES
AM57	AM1BN1004GA-13	Eu-152	1.83 +/- 0.02 E1 pCi	1.6 +/- 0.5 E1 pCi	0.87 +/- 0.27	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %

Samples Prepared For: TRA

LogNo	SampleID	Nuclide	Known Activity	Expt'l Activity	Ratio Exp/Known	Agreement
AM69	AM11BN1004AL-2	Am-241	1.48 +/- 0.02 E0 pCi	1.46 +/- 0.13 E0 pCi	0.99 +/- 0.09	YES
AM69	AM11BN1004AL-2	Pu-238	2.24 +/- 0.02 E0 pCi	2.4 +/- 0.2 E0 pCi	1.07 +/- 0.09	YES
AM69	AM11BN1004AL-2	Pu-239	2.56 +/- 0.03 E0 pCi	2.7 +/- 0.3 E0 pCi	1.05 +/- 0.12	YES

Samples Prepared By: \_\_\_\_\_

ACTIVITIES ARE AS OF: 12/1/2004 UNCERTAINTIES ARE ONE SIGMA

Acceptance Criteria: 3 sigma 50 % -50 %





## **Appendix C-1**

### **Gamma Spectroscopy Internal QA/QC Program Results**

# **RADIATION MEASUREMENTS LABORATORY**

**Supporting QA/QC Date**

## **AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS**

For: RML Ge Detector System: A4, Model No. CAN-4

### **INTERNAL QC CHECKS:**

Gamma-ray energy calibration (Daily or prior to detector use, pulsar equivalents are determined weekly for pulsar based detector systems).

Monthly instrument background check.

Monthly Eu-152 calibration source check.

### **EXTERNAL QC CHECKS (when applicable):**

Mixed Analyte Performance Evaluation Program (MAPEP)

**SEE RESULTS FOR RML EXTERNAL QC CHECKS IN APPENDIX D**

Analyzed by: \_\_\_\_\_ Date: \_\_\_\_\_

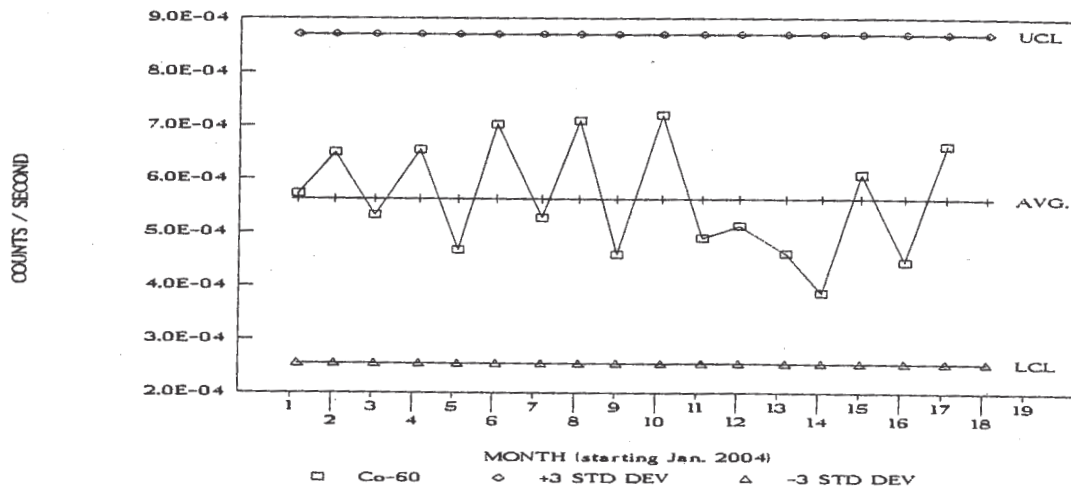
Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

### **COMMENTS:**

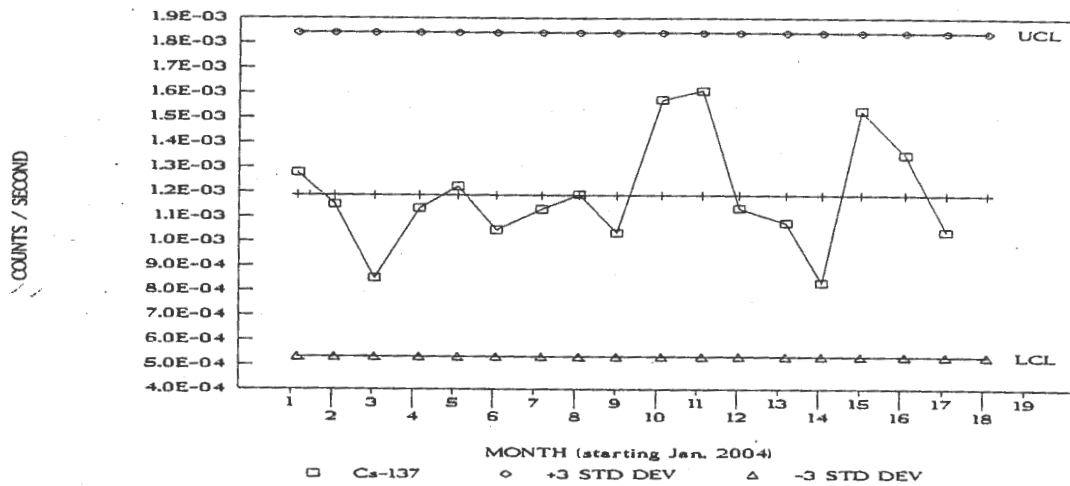
All applicable QA/QC checks demonstrate the RML was "in control" during the time frame the samples were counted and analyzed.

# RADIATION MEASUREMENTS LABORATORY

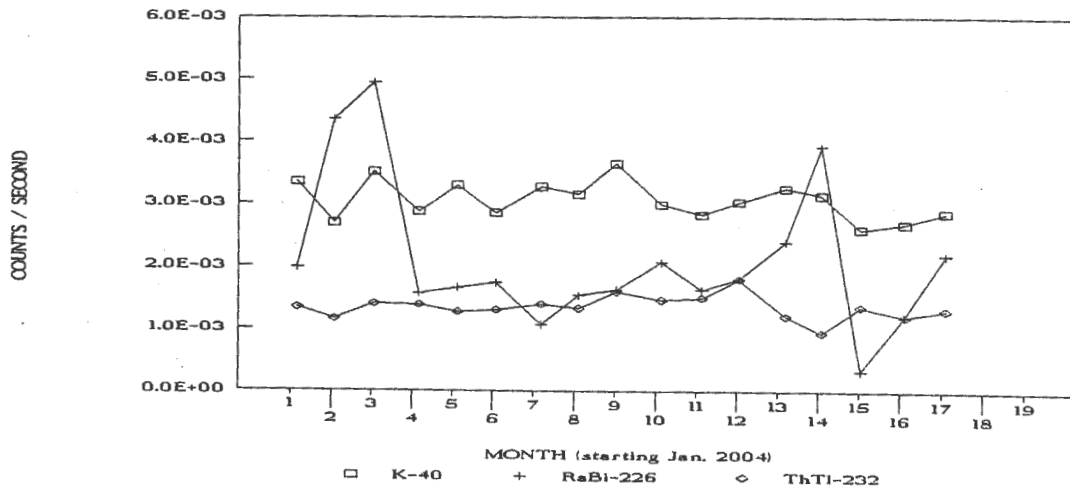
A-4 (CAN-4) CO-60 AMBIENT BACKGROUND



A-4 (CAN-4) CS-137 AMBIENT BACKGROUND



A-4 (CAN-4) NATURAL ACTIVITY BACKGROUND



```
ZERO= -1.4624
ENERGY= -0.1006+ 0.36068(X)+-1.07084E-08(X)**2
WIDTH= 2.460+ 5.9867E-04(X)
```

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.378	238.632	238.633	-0.001	2.77
1618.740	583.191	583.188	0.003	3.49
2387.896	860.564	860.572	-0.008	3.94
4496.118	1620.735	1620.806	-0.071	5.14
7252.224	2614.533	2614.526	0.007	6.78

Pulser equivalent energies: 260.61 2653.99

## RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRENIES	%ERROR
663.38	2.8	238.63	57488.	10	1.564E+00	0.4		
669.90	2.8	240.99	5082.	10	1.499E+00	1.5		
1618.74	3.5	583.19	15876.	8	1.534E+00	0.8		
2018.32	3.8	727.29	2918.	8	1.622E+00	1.9		
2387.90	3.9	860.57	1558.	8	1.515E+00	2.6		
4496.12	5.1	1620.81	289.	8	1.507E+00	7.0		
7252.22	6.8	2614.53	4458.	8	1.581E+00	1.6	1.558E+00	0.4

## QUALITY FILE ENTRIES

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
082404	0835	238.6	2.8	1.57E+00	1.1	10	583.2	3.5	1.54E+00	0.8	8	860.6	4.2	1.58E+00	2.6	8
083104	0759		2.7	1.56E+00	0.4	10		3.5	1.53E+00	1.0	8		4.0	1.57E+00	4.3	8
091404	0759		2.8	1.56E+00	0.4	10		3.5	1.54E+00	1.0	8		4.2	1.65E+00	2.6	8
092104	0816		2.7	1.54E+00	0.4	10		3.5	1.52E+00	0.9	8		4.1	1.55E+00	2.6	8
092804	0800		2.8	1.55E+00	0.6	10		3.5	1.52E+00	0.9	8		4.0	1.58E+00	2.6	8
100404	0826		2.8	1.56E+00	0.4	10		3.5	1.53E+00	0.8	8		3.9	1.52E+00	2.6	8

Th-228 CALIBRATION 09-NOV-04 08:23  
DETECTOR SYSTEM: A4

ZERO= -1.4973  
ENERGY= -0.0981+ 0.36064(X)+-1.07486E-08(X)\*\*2  
WIDTH= 2.488+ 5.8851E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.468	238.632	238.633	-0.001	2.75
1618.919	583.191	583.187	0.004	3.50
2388.229	860.564	860.601	-0.037	3.91
4496.380	1620.735	1620.737	-0.002	5.26
7252.958	2614.533	2614.531	0.002	6.67

Pulser equivalent energies: 260.63 2654.22

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
663.46	2.8	238.63	57530.	10	1.563E+00	1.1		
669.98	2.8	240.98	5208.	10	1.534E+00	4.0		
1618.92	3.5	583.19	15783.	8	1.524E+00	1.3		
2018.67	3.7	727.34	2851.	8	1.585E+00	1.9		
2388.23	3.9	860.60	1658.	8	1.613E+00	2.5		
4496.42	5.1	1620.75	287.	8	1.500E+00	8.8		
7252.96	6.8	2614.53	4404.	8	1.564E+00	1.6		

1.5556E+00 0.7

## QUALITY FILE ENTRIES

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	LPEQ	HPEQ
100404	0826	238.6	2.8	1.56E+00	0.4	10	583.2	3.5	1.53E+00	0.8	8	260.6	2654.0
101204	0831	2.8	2.8	1.55E+00	0.4	10	3.5	1.56E+00	1.0	0.8	8	260.6	2654.0
101904	0725	2.8	2.8	1.55E+00	0.7	10	3.5	1.54E+00	0.8	0.8	8	260.6	2654.2
102604	0831	2.8	2.8	1.55E+00	0.7	10	3.5	1.53E+00	1.2	0.8	8	260.6	2654.1
110204	0807	2.8	2.8	1.56E+00	0.8	10	3.5	1.54E+00	0.8	0.8	8	260.6	2654.1
110904	0823	2.8	2.8	1.56E+00	1.1	10	3.5	1.52E+00	1.3	0.8	8	260.6	2654.2
100404	0826	1620.7	5.1	1.51E+00	7.0	8	2614.5	6.8	1.58E+00	1.6	8	260.6	2654.0
101204	0831	5.2	5.2	1.58E+00	6.7	8	6.9	1.55E+00	1.6	1.6	8	260.6	2654.0
101904	0725	5.2	5.2	1.45E+00	7.2	8	6.7	1.52E+00	1.7	1.7	8	260.6	2654.2
102604	0831	5.0	5.0	1.56E+00	6.7	8	6.6	1.52E+00	1.7	1.7	8	260.6	2654.1
110204	0807	5.6	5.6	1.59E+00	7.7	8	6.7	1.53E+00	2.1	2.1	8	260.6	2654.1
110904	0823	5.1	5.1	1.50E+00	8.8	8	6.8	1.56E+00	1.6	1.6	8	260.6	2654.2

Th-228 CALIBRATION 10-DEC-04 07:45  
DETECTOR SYSTEM: A4

ZERO= -1.4183  
ENERGY= -0.1009+ 0.36056(X)+-1.04564E-08(X)\*\*2  
WIDTH= 2.565+ 5.7818E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.545	238.632	238.632	0.000	2.78
1619.221	583.191	583.189	0.002	3.49
2388.671	860.564	860.591	-0.027	4.12
4497.197	1620.735	1620.693	0.042	5.28
7254.508	2614.533	2614.535	-0.002	6.65

Pulser equivalent energies: 260.58 2653.94

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRENIES	%ERROR
663.55	2.8	238.63	56727.	10	1.542E+00	0.4		
670.02	2.8	240.97	5192.	10	1.530E+00	1.5		
1619.22	3.5	583.19	15772.	8	1.524E+00	1.2		
2018.96	3.7	727.30	2784.	8	1.549E+00	3.8		
2388.67	4.1	860.59	1687.	8	1.642E+00	2.5		
4497.12	5.3	1620.67	303.	8	1.583E+00	7.6		
7254.48	6.7	2614.52	4372.	8	1.554E+00	2.0		
					1.542E+00	0.4		

QUALITY FILE ENTRIES											
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
110904	0823	238.6	2.8	1.56E+00	1.1	10	583.2	3.5	1.52E+00	1.3	8
111604	0745		2.8	1.56E+00	0.4	10		3.5	1.53E+00	1.0	8
112304	0831		2.8	1.54E+00	0.4	10		3.5	1.50E+00	1.2	8
113004	0759		2.8	1.55E+00	1.1	10		3.5	1.54E+00	0.8	8
120804	0818		2.8	1.56E+00	0.4	10		3.6	1.54E+00	0.8	8
121004	0745		2.8	1.54E+00	0.4	10		3.5	1.52E+00	1.2	8
110904	0823	1620.7	5.1	1.50E+00	8.8	8	-1.50	0.361	1.5559E+00	0.7	260.6
111604	0745		5.4	1.58E+00	10.2	9	-1.51	0.361	1.5512E+00	0.4	260.6
112304	0831		5.4	1.57E+00	11.3	8	-1.50	0.361	1.5383E+00	0.4	260.6
113004	0759		5.6	1.62E+00	6.6	8	-1.49	0.361	1.5447E+00	0.6	260.6
120804	0818		5.2	1.51E+00	8.1	8	-1.45	0.361	1.5514E+00	0.4	260.6
121004	0745		5.3	1.58E+00	7.6	8	-1.42	0.361	1.5420E+00	0.4	260.6

Th-228 CALIBRATION 08-JAN-05 10:16  
DETECTOR SYSTEM: A4

ZERO= -1.5115  
ENERGY= -0.1020+ 0.36055(X)+-1.18480E-08(X)\*\*2  
WIDTH= 2.498+ 5.6169E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.676	238.632	238.634	-0.002	2.76
1619.379	583.191	583.183	0.008	3.48
2388.895	860.564	860.593	-0.029	3.93
4498.041	1620.735	1620.866	-0.131	4.96
7255.071	2614.533	2614.520	0.013	6.57

Pulsar equivalent energies: 260.60 2654.32

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
663.67	2.8	238.63	56739.	10	1.541E+00	0.4		
670.22	2.8	240.99	5093.	10	1.500E+00	1.5		
1619.38	3.5	583.18	15700.	8	1.515E+00	0.8		
2019.15	3.8	727.30	2688.	8	1.493E+00	2.7		
2388.89	3.9	860.59	1608.	8	1.563E+00	2.6		
4498.04	4.9	1620.86	333.	10	1.736E+00	6.5		
7255.06	6.6	2614.51	4438.	8	1.573E+00	1.9		
							1.537E+00	0.4

QUALITY FILE ENTRIES									
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
121004	0745	238.6	2.8	1.54E+00	0.4	10	583.2	3.5	1.52E+00
121704	0731	2.8	2.8	1.56E+00	0.9	10	8	3.5	1.51E+00
122104	0901	2.8	2.8	1.55E+00	0.9	10	8	3.5	1.53E+00
123004	0802	2.8	2.8	1.55E+00	0.6	10	8	3.5	1.55E+00
010305	0846	2.8	2.8	1.54E+00	0.4	10	8	3.5	1.52E+00
010805	1016	2.8	2.8	1.54E+00	0.4	10	8	3.5	1.52E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE
121004	0745	1620.7	5.3	1.58E+00	7.6	8	-1.42	0.361	1.5420E+00
121704	0731	5.3	5.3	1.83E+00	6.1	8	-1.45	0.361	1.5374E+00
122104	0901	5.3	5.3	1.44E+00	7.1	8	-1.45	0.361	1.5316E+00
123004	0802	5.2	5.2	1.68E+00	6.7	8	-1.51	0.361	1.5502E+00
010305	0846	6.2	6.2	1.68E+00	6.9	8	-1.45	0.361	1.5392E+00
010805	1016	4.9	4.9	1.74E+00	6.5	10	-1.51	0.361	1.5370E+00
							FLAG	ZERO	GAIN
							8	-1.42	0.361
							8	-1.45	0.361
							8	-1.45	0.361
							8	-1.51	0.361
							10	-1.45	0.361
							8	-1.51	0.361
							8	-1.42	0.361
							8	-1.45	0.361
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							10	-1.45	0.361
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							8	-1.51	0.361
							10	-1.45	0.361
							8	-1.51	0.361
							8	-1.42	0.361
							8	-1.45	0.361
							8	-1.45	0.361



Th-228 CALIBRATION 17-FEB-05 09:43  
DETECTOR SYSTEM: A4

ZERO= -1.4015  
ENERGY= -0.0888+ 0.36046(X)+-8.70353E-09(X)\*\*2  
WIDTH= 2.568+ 5.8813E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.685	238.632	238.632	0.000	2.78
1619.634	583.191	583.191	0.000	3.54
2389.220	860.564	860.567	-0.003	4.20
4498.408	1620.735	1620.712	0.023	5.19
7256.311	2614.533	2614.535	-0.002	6.79

Pulser equivalent energies: 260.60 2654.15

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRENIES	%ERROR
663.68	2.8	238.63	57612.	10	1.566E+00	0.9		
670.23	2.8	240.99	5256.	10	1.549E+00	3.2		
1619.63	3.5	583.19	15756.	8	1.521E+00	1.2		
2019.43	3.8	727.29	2832.	8	1.574E+00	2.7		
2389.22	4.2	860.57	1620.	8	1.575E+00	2.9		
4498.37	5.2	1620.70	263.	8	1.373E+00	8.8		
7256.31	6.8	2614.54	4421.	8	1.568E+00	1.8		
							1.554E+00	0.7

QUALITY FILE ENTRIES											
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
010805	1016	238.6	2.8	1.54E+00	0.4	10	583.2	3.5	1.52E+00	0.8	8
012205	0718		2.8	1.55E+00	1.1	10		3.5	1.53E+00	1.1	8
012905	0723		2.8	1.55E+00	0.4	10		3.5	1.55E+00	0.8	8
020505	0718		2.8	1.55E+00	0.4	10		3.5	1.54E+00	0.8	8
020905	0801		2.8	1.56E+00	1.0	10		3.5	1.53E+00	0.8	8
021705	0943		2.8	1.57E+00	0.9	10		3.5	1.52E+00	1.2	8
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES	%ERR	LPEQ
010805	1016	1620.7	4.9	1.74E+00	6.5	10	-1.51	0.361	1.5370E+00	0.4	260.6
012205	0718		5.2	1.60E+00	8.4	9	-1.53	0.361	1.5317E+00	0.7	260.6
012905	0723		5.4	1.46E+00	8.0	8	-1.76	0.361	1.5490E+00	0.4	260.6
020505	0718		5.2	1.57E+00	6.7	8	-1.39	0.361	1.5531E+00	0.4	260.6
020905	0801		5.4	1.52E+00	10.2	8	-1.41	0.360	1.5395E+00	0.6	260.6
021705	0943		5.2	1.37E+00	8.8	8	-1.40	0.360	1.5541E+00	0.7	260.6

ZERO= -1.5277  
ENERGY= -0.0990+ 0.36053(X)+-1.05621E-08(X)\*\*2  
WIDTH= 2.480+ 6.0421E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.704	238.1632	238.633	-0.001	2.77
1619.448	583.191	583.188	0.003	3.51
2338.917	860.564	860.574	-0.010	3.86
4497.964	1620.735	1620.802	-0.068	5.42
7255.174	2614.533	2614.527	0.006	6.72

Pulser equivalent energies: 260.60 2654.29

## RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRES	%ERROR	NET MICROCURRIES	%ERROR
663.70	2.8	238.63	57113.	10	1.53E+00	0.4		
670.23	2.8	240.99	5010.	10	1.47E+00	1.5		
1619.45	3.5	583.19	16043.	8	1.550E+00	0.8		
2019.22	3.7	727.30	2706.	8	1.504E+00	2.0		
2388.92	3.9	860.57	1588.	8	1.544E+00	2.6		
4497.97	5.5	1620.80	277.	8	1.447E+00	7.3		
7255.17	6.7	2614.53	4351.	8	1.543E+00	1.7	1.548E+00	0.4

QUALITY FILE ENTRIES																				
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	DATE	TIME	ENERGY	WIDTH	UCURIES
021705	0943	238.6	2.8	1.57E+00	0.9	10	583.2	3.5	1.52E+00	1.2	8	860.6	4.2	1.57E+00	2.9	8				
022505	0731		2.8	1.55E+00	1.0	10		3.5	1.53E+00	0.8	8		4.1	1.56E+00	3.3	8				
022605	0735		2.8	1.56E+00	0.4	10		3.5	1.54E+00	0.8	8		4.1	1.57E+00	2.6	8				
030405	0739		2.8	1.54E+00	0.6	10		3.5	1.52E+00	0.8	8		4.0	1.51E+00	2.6	8				
031205	0743		2.7	1.55E+00	0.5	10		3.5	1.51E+00	1.4	8		4.1	1.59E+00	2.6	8				
032205	0805		2.8	1.55E+00	0.4	10		3.5	1.55E+00	0.8	8		3.9	1.54E+00	2.6	8				
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	%ERR	FLAG	ZERO	GAIN	NET	UCURIE	%ERR	LPEQ	HPEQ			
021705	0943	1620.7	5.2	1.37E+00	8.8	8	2614.5	6.8	1.57E+00	1.8	8	-1.40	0.360	1.5541E+00	0.7	260.6	2654.2			
022505	0731		5.4	1.68E+00	6.4	8		6.8	1.55E+00	1.6	8	-1.51	0.360	1.5450E+00	0.6	260.6	2654.4			
022605	0755		5.5	1.44E+00	11.3	8		6.8	1.54E+00	1.6	8	-1.47	0.360	1.5511E+00	0.4	260.6	2654.4			
030405	0739		5.3	1.38E+00	7.3	11		6.9	1.58E+00	2.0	8	-1.38	0.360	1.5385E+00	0.5	260.6	2654.4			
031205	0743		4.5	1.52E+00	10.1	8		6.8	1.56E+00	1.6	8	-1.53	0.361	1.5418E+00	0.5	260.6	2654.2			
032205	0805		5.5	1.45E+00	7.3	8		6.7	1.54E+00	1.7	8	-1.53	0.361	1.5481E+00	0.4	260.6	2654.3			

Th-228 CALIBRATION 29-MAR-05 08:14  
DETECTOR SYSTEM: A4

ZERO= -1.5731  
ENERGY= -0.0880+ 0.36053(X)+-9.14861E-09(X)\*\*2  
WIDTH= 2.566+ 5.6127E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
663.719	238.632	238.633	-0.001	2.76
1619.462	583.191	583.189	0.002	3.54
2388.884	860.564	860.562	0.002	4.05
4497.919	1620.735	1620.804	-0.069	5.13
7255.008	2614.533	2614.527	0.006	6.57

Pulser equivalent energies: 260.58 2654.22

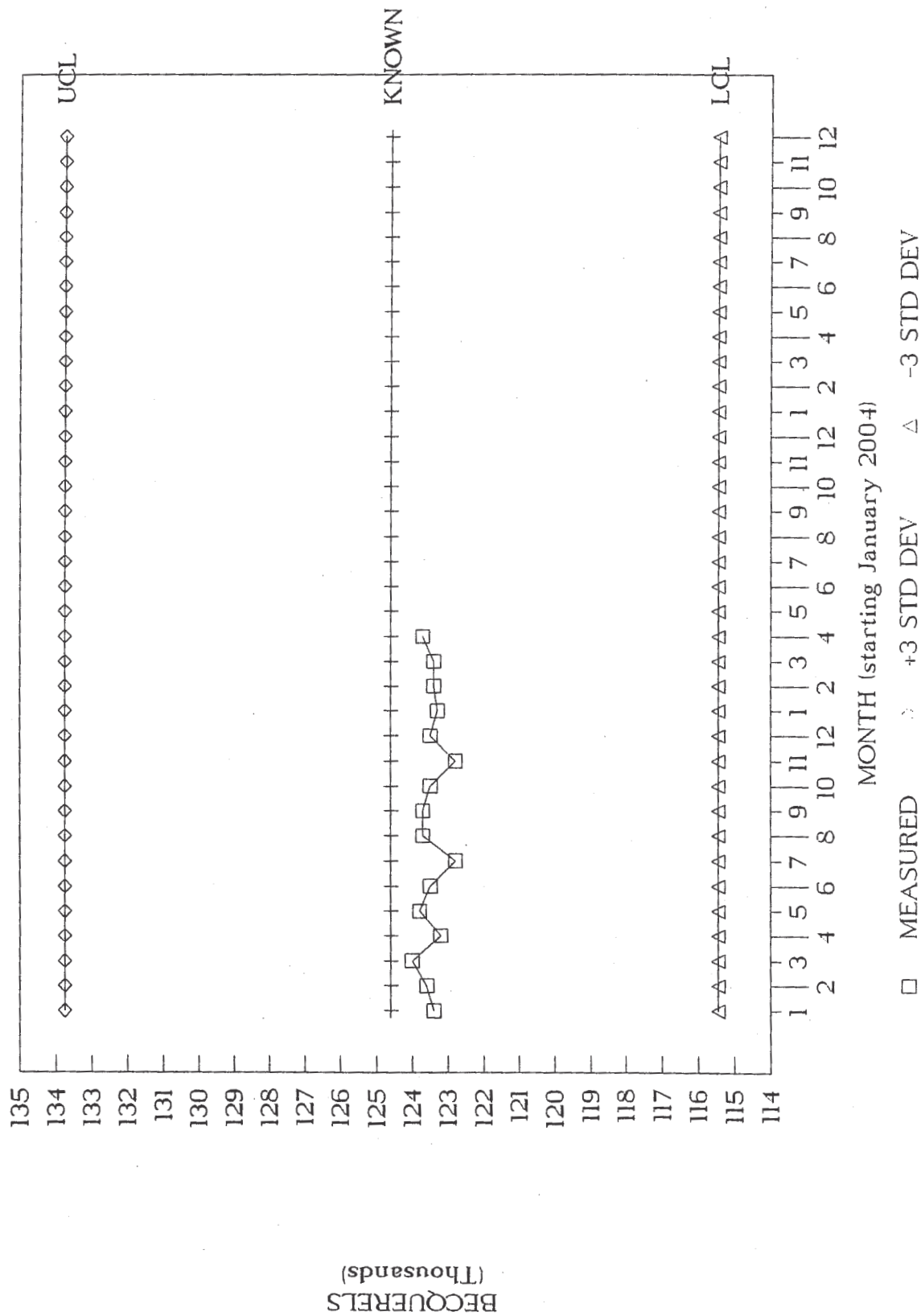
# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 10

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
663.71	2.8	238.63	57142.	10	1.555E+00	1.1		
670.24	2.8	240.98	5225.	10	1.541E+00	3.9		
1619.46	3.5	583.19	15841.	8	1.532E+00	0.8		
2019.26	3.8	727.31	2881.	8	1.603E+00	2.3		
2388.88	4.1	860.56	1588.	8	1.546E+00	3.3		
4497.94	5.3	1620.81	294.	8	1.534E+00	6.8		
7255.01	6.6	2614.53	4302.	8	1.529E+00	1.7		
					1.540E+00	0.6		

QUALITY FILE ENTRIES											
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
022505	0731	238.6	2.8	1.55E+00	1.0	10	583.2	3.5	1.53E+00	0.8	8
022605	0755		2.8	1.56E+00	0.4	10		3.5	1.54E+00	0.8	8
030405	0739		2.8	1.54E+00	0.6	10		3.5	1.52E+00	0.8	8
031205	0743		2.7	1.55E+00	0.5	10		3.5	1.51E+00	1.4	8
032205	0805		2.8	1.55E+00	0.4	10		3.5	1.55E+00	0.8	8
032905	0814		2.8	1.55E+00	1.1	10		3.5	1.53E+00	0.8	8
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
022505	0731	1620.7	5.4	1.68E+00	6.4	8	2614.5	6.8	1.55E+00	1.6	8
022605	0755		5.5	1.44E+00	11.3	8		6.8	1.54E+00	1.6	8
030405	0739		5.3	1.58E+00	7.3	11		6.9	1.58E+00	2.0	8
031205	0743		4.5	1.52E+00	10.1	8		6.8	1.56E+00	1.6	8
032205	0805		5.5	1.45E+00	7.3	8		6.7	1.54E+00	1.7	8
032905	0814		5.3	1.53E+00	6.8	8		6.6	1.53E+00	1.7	8
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE	%ERR	FLAG
							-1.51	0.360	1.5450E+00	0.6	8
							-1.47	0.360	1.5511E+00	0.4	8
							-1.38	0.360	1.5385E+00	0.5	8
							-1.53	0.361	1.5418E+00	0.5	8
							-1.53	0.361	1.5481E+00	0.4	8
							-1.57	0.361	1.5396E+00	0.6	8

# A4 (CAN-4) CALIBRATION SOURCE CHECK

EU-152 (NIST 4218-E-49)



# **RADIATION MEASUREMENTS LABORATORY**

**Supporting QA/QC Date**

## **AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS**

For: RML Ge Detector System: A6, Model No. PG-13

### **INTERNAL QC CHECKS:**

Gamma-ray energy calibration (Daily or prior to detector use, pulsar equivalents are determined weekly for pulsar based detector systems).

Monthly instrument background check.

Monthly Eu-152 calibration source check.

### **EXTERNAL QC CHECKS (when applicable):**

Mixed Analyte Performance Evaluation Program (MAPEP)

**SEE RESULTS FOR RML EXTERNAL QC CHECKS IN APPENDIX D**

Analyzed by: \_\_\_\_\_ Date: \_\_\_\_\_

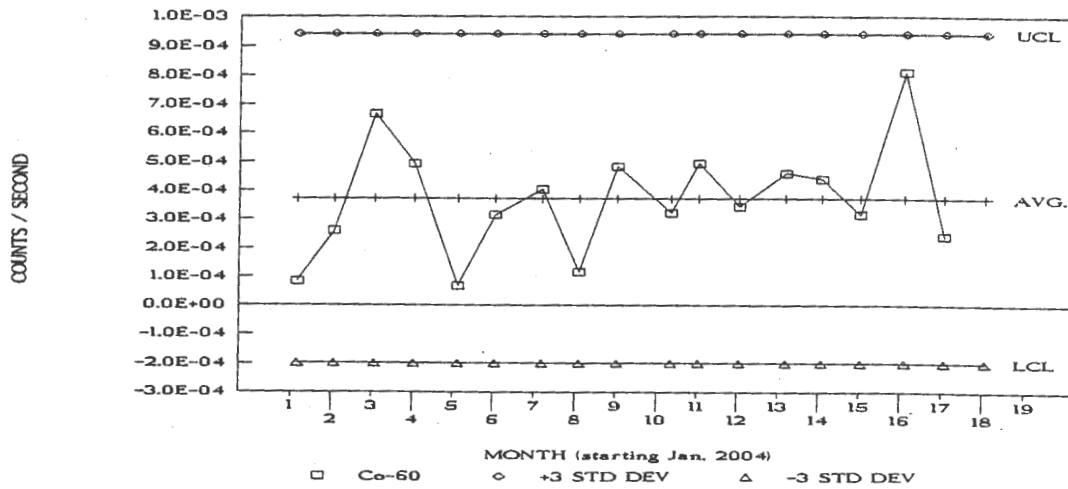
Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

### **COMMENTS:**

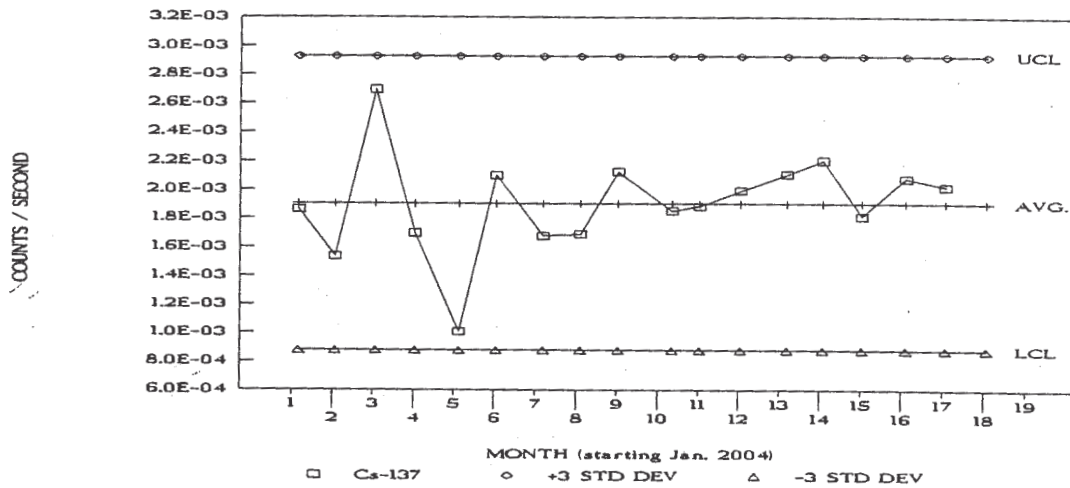
All applicable QA/QC checks demonstrate the RML was "in control" during the time frame the samples were counted and analyzed.

# RADIATION MEASUREMENTS LABORATORY

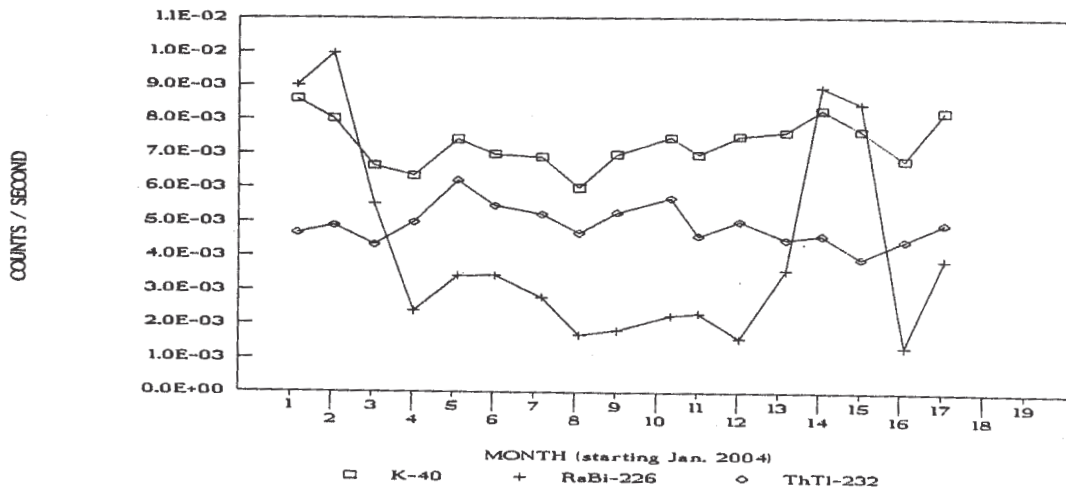
## A6 (PG-13) CO-60 AMBIENT BACKGROUND



## A6 (PG-13) CS-137 AMBIENT BACKGROUND



## A6 (PG-13) NATURAL ACTIVITY BACKGROUND



Th-228 CALIBRATION 04-OCT-04 08:43  
DETECTOR SYSTEM: A6

ZERO= 0.0183  
ENERGY= -0.0787+ 0.36180 (X)+-9.30080E-09 (X)\*\*2  
WIDTH= 2.974+ 6.0008E-04 (X).

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
659.783	238.632	238.635	-0.003	3.32
1612.156	583.191	583.185	0.006	4.06
2378.924	860.564	860.574	-0.010	4.65
4480.768	1620.735	1620.890	-0.155	5.11
7227.926	2614.533	2614.518	0.015	7.55

Pulser equivalent energies: 264.30 2590.30

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
659.77	3.3	238.63	87300.	10	1.709E+00	0.3		
666.28	3.3	240.98	7927.	10	1.680E+00	1.2		
1612.17	4.0	583.18	25584.	8	1.686E+00	0.7		
2010.60	4.3	727.32	4388.	8	1.641E+00	2.1		
2378.92	4.7	860.57	2734.	8	1.779E+00	3.2		
4480.76	5.0	1620.87	472.	8	1.657E+00	7.6		
7227.94	7.7	2614.50	7250.	8	1.697E+00	1.8		
					1.703E+00	0.3		

"A" OF WIDTH EQUATION IS NOT IN AGREEMENT  
AVERAGE VALUE= 2.527524 STD DEV= 4.9847197E-02  
CURRENT VALUE= 2.973834 QUALITY FLAG VALUE= 8.953559

QUALITY FILE ENTRIES												
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
082404	0835	238.6	2.9	1.73E+00	0.8	10	583.2	3.7	1.68E+00	0.5	8	
083104	0800		2.8	1.72E+00	0.4	10		3.8	1.69E+00	1.9	8	
091404	0759		2.8	1.72E+00	0.8	10		3.7	1.68E+00	1.1	8	
092104	0816		2.8	1.71E+00	0.9	10		3.7	1.67E+00	0.8	8	
092804	0800		2.8	1.71E+00	0.5	10		3.7	1.66E+00	0.6	8	
100404	0844		3.3	1.71E+00	0.3	10		4.0	1.69E+00	0.7	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
082404	0835	1620.7	5.6	1.89E+00	6.0	9	2614.5	7.9	1.72E+00	2.2	8	
083104	0800		5.4	1.59E+00	9.5	8		7.8	1.71E+00	1.7	8	
091404	0759		6.6	1.76E+00	6.5	8		7.6	1.66E+00	2.1	8	
092104	0816		5.3	1.71E+00	6.8	8		7.7	1.67E+00	2.2	8	
092804	0800		5.5	1.72E+00	5.3	8		7.9	1.70E+00	2.0	8	
100404	0844		5.0	1.66E+00	7.6	8		7.7	1.70E+00	1.8	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES	%ERR	LPEQ	HPEQ
082404	0835	1620.7	5.6	1.89E+00	6.0	9	0.11	0.362	1.7156E+00	0.6	264.1	2590.1
083104	0800		5.4	1.59E+00	9.5	8	0.20	0.362	1.7132E+00	0.3	264.0	2589.9
091404	0759		6.6	1.76E+00	6.5	8	0.25	0.362	1.6958E+00	0.6	264.1	2590.0
092104	0816		5.3	1.71E+00	6.8	8	0.01	0.362	1.6847E+00	0.5	264.1	2590.3
092804	0800		5.5	1.72E+00	5.3	8	0.07	0.362	1.6928E+00	0.4	263.9	2589.8
100404	0844		5.0	1.66E+00	7.6	8	0.02	0.362	1.7027E+00	0.3	264.3	2590.3



TH-228 CALIBRATION 12-OCT-04 08:32  
DETECTOR SYSTEM: A6

ZERO= -1.3981  
ENERGY= -0.0788+ 0.36319(X)+-8.83241E-09(X)\*\*2  
WIDTH= 2.410+ 7.0151E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
658.672	238.632	238.633	-0.001	2.73
1607.408	583.191	583.187	0.004	3.67
2371.213	860.564	860.567	-0.003	4.24
4464.900	1620.735	1620.848	-0.113	5.33
7201.630	2614.533	2614.522	0.011	7.52

Pulser equivalent energies: 264.13 2590.81

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
658.66	2.7	238.63	87115.	10	1.715E+00	0.6		
665.16	2.7	240.99	8038.	10	1.713E+00	2.2		
1607.41	3.7	583.19	25497.	8	1.688E+00	1.2		
2004.34	3.9	727.34	4654.	10	1.748E+00	1.9		
2371.21	4.2	860.57	2639.	8	1.724E+00	3.0		
4464.90	5.3	1620.85	434.	8	1.530E+00	7.8		
7201.63	7.5	2614.52	7031.	8	1.651E+00	1.6		

1.699E+00 0.5

QUALITY FILE ENTRIES													
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	LPEQ	HPEQ
100404	0844	238.6	3.3	1.71E+00	0.3	10	583.2	4.0	1.69E+00	0.7	8	860.6	4.7
100504	1102	2.9	1.73E+00	1.2	10	10	3.7	1.67E+00	1.0	8	4.2	1.67E+00	2.1
100704	1334	2.9	1.68E+00	0.8	10	10	3.8	1.66E+00	1.4	8	4.3	1.75E+00	2.0
100704	1352	2.9	1.69E+00	0.8	10	10	3.8	1.66E+00	1.4	8	4.4	1.67E+00	2.1
101104	1641	2.7	1.72E+00	0.7	10	10	3.6	1.68E+00	1.5	8	4.3	1.73E+00	3.0
101204	0832	2.7	1.71E+00	0.6	10	10	3.7	1.69E+00	1.2	8	4.2	1.72E+00	3.0
100404	0844	1620.7	5.0	1.66E+00	7.6	8	2614.5	7.7	1.70E+00	1.8	8	0.02	0.362
100504	1102	5.7	1.65E+00	6.7	9	9	7.5	1.67E+00	1.4	8	0.00	0.362	1.6854E+00
100704	1334	5.5	1.58E+00	5.9	8	8	7.6	1.65E+00	1.6	8	-1.62	0.363	1.6696E+00
100704	1352	5.7	1.68E+00	5.9	8	8	7.8	1.57E+00	6.7	9	-1.63	0.363	1.6794E+00
101104	1641	6.1	1.79E+00	5.5	8	8	7.4	1.68E+00	1.8	8	-1.51	0.363	1.7089E+00
101204	0832	5.3	1.53E+00	7.8	8	8	7.5	1.65E+00	1.6	8	-1.40	0.363	1.6991E+00



```
ZERO= -1.1497
ENERGY= -0.1005+ 0.36325(X)+-1.01784E-08(X)**2
WIDTH= 2.427+ 7.4648E-04(X)
```

CHANNEL	ENERGY	CAL.	ENG	D-ENG	WIDTH
658.380	238.632	238.	633	-0.001	2.753
1606.986	583.191	583.	190	0.001	3.581
2370.609	860.564	860.	544	0.020	4.277
4464.017	1620.735	1620.	824	-0.089	6.151
7200.510	2614.533	2614.	525	0.008	7.566

Pulsar equivalent energies: 264.06 2591.02

## RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRES	%ERROR	NET MICROCURRES	%ERROR
658.37	2.8	238.63	86093.	10	1.694E+00	1.1		
664.86	2.8	240.99	8032.	10	1.711E+00	3.7		
1606.99	3.6	583.19	24817.	8	1.643E+00	1.3		
2003.80	4.1	727.32	4422.	8	1.661E+00	1.6		
2370.61	4.3	860.54	2579.	8	1.685E+00	2.6		
4463.94	6.4	1620.80	492.	8	1.734E+00	5.9		
7200.49	7.7	2614.52	7134.	8	1.677E+00	1.8	1.674E+00	0.7

## QUALITY FILE ENTRIES

QUALITY FILE ENTRIES																		
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG		
101204	0832	238.6	2.7	1.71E+00	0.6	10	583.2	3.7	1.69E+00	1.2	8	860.6	4.2	1.72E+00	3.0	8		
101204	0832		2.8	1.71E+00	1.1	10		3.6	1.67E+00	1.2	8		4.5	1.80E+00	2.0	8		
101204	0726		2.7	1.72E+00	0.9	10		3.7	1.68E+00	1.2	8		4.3	1.69E+00	2.2	8		
102604	0817		2.7	1.02E+00	0.6	10		3.6	1.65E+00	1.0	8		4.3	1.70E+00	2.1	8		
110204	0808		2.7	1.69E+00	0.6	10		3.6	1.68E+00	0.8	8		4.2	1.71E+00	2.1	8		
110904	0823		2.7	1.72E+00	1.0	10		3.6	1.64E+00	1.3	8		4.3	1.69E+00	2.6	8		
111604	0749		2.8	1.69E+00	1.1	10		3.6	1.64E+00	1.3	8							
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET	UCURIES	%ERR	LPEQ	HPEQ
101204	0832	1620.7	5.3	1.53E+00	7.8	8	2614.5	7.5	1.65E+00	1.6	8	-1.40	0.363	1.6591E+00	0.5	264.1	2590.8	
101904	0726		5.6	1.84E+00	6.0	8		7.7	1.66E+00	2.0	8	-1.31	0.363	1.6852E+00	0.7	264.1	2591.2	
102604	0817		5.6	1.46E+00	9.8	9		7.7	1.71E+00	1.6	8	-1.37	0.363	1.7038E+00	0.7	264.3	2591.4	
110204	0808		5.5	1.52E+00	8.5	8		7.8	1.68E+00	1.7	8	-1.26	0.363	1.6799E+00	0.5	264.2	2591.1	
110904	0823		5.8	1.71E+00	7.5	8		7.6	1.72E+00	1.7	8	-1.29	0.363	1.7007E+00	0.6	264.1	2591.1	
111604	0749		6.4	1.73E+00	5.9	8		7.7	1.68E+00	1.8	8	-1.15	0.363	1.6739E+00	0.7	264.1	2591.0	

Th-228 CALIBRATION 17-DEC-04 07:31  
DETECTOR SYSTEM: A6

ZERO= -1.0714  
ENERGY= -0.0832+ 0.36320(X)+-8.85676E-09(X)\*\*2

WIDTH= 2.321+ 7.3223E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
658.333	238.632	238.633	-0.001	2.74
1607.044	583.191	583.189	0.002	3.59
2370.809	860.564	860.564	0.000	4.10
4464.313	1620.735	1620.805	-0.070	5.49
7201.083	2614.533	2614.526	0.007	7.62

Pulser equivalent energies: 264.30 2591.06

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
658.33	2.7	238.63	86880.	10	1.709E+00	0.6		
664.84	2.7	241.00	7898.	10	1.640E+00	2.3		
1607.04	3.6	583.19	25319.	8	1.677E+00	0.8		
2003.93	3.8	727.33	4500.	8	1.691E+00	1.5		
2370.81	4.1	860.56	2672.	8	1.747E+00	3.3		
4464.05	5.6	1620.71	478.	9	1.684E+00	7.4		
7201.08	7.6	2614.53	7098.	8	1.669E+00	1.8		
					1.692E+00	0.5		

QUALITY FILE ENTRIES												
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
111604	0749	238.6	2.8	1.69E+00	1.1	10	583.2	3.6	1.64E+00	1.3	8	
112304	0832		2.7	1.72E+00	1.0	10		3.6	1.69E+00	0.8	8	
113004	0800		2.7	1.73E+00	0.9	10		3.6	1.68E+00	1.0	8	
120804	0818		2.7	1.76E+00	0.5	10		3.6	1.72E+00	0.8	8	
121004	0746		2.7	1.72E+00	0.9	10		3.6	1.69E+00	1.0	8	
121704	0731		2.7	1.71E+00	0.6	10		3.6	1.68E+00	0.8	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE	%ERR	LPEQ	HPEQ
111604	0749	1620.7	6.4	1.73E+00	5.9	8	-1.15	0.363	1.6739E+00	0.7	264.1	2591.0
112304	0832		6.1	1.73E+00	7.6	8	-1.24	0.363	1.6885E+00	0.5	264.0	2590.8
113004	0800		6.5	1.83E+00	5.4	8	-1.18	0.363	1.7113E+00	0.6	264.0	2590.8
120804	0818		5.4	1.77E+00	5.3	8	-0.94	0.363	1.7472E+00	0.4	264.3	2590.9
121004	0746		6.0	1.68E+00	7.5	8	-1.05	0.363	1.7046E+00	0.6	264.1	2590.9
121704	0731		5.6	1.68E+00	7.4	9	-1.07	0.363	1.6924E+00	0.5	264.3	2591.1

Th-228 CALIBRATION 22-JAN-05 07:18  
DETECTOR SYSTEM: A6

ZERO= -1.2223  
ENERGY= -0.0573+ 0.36317(X)+-7.44404E-09(X)\*\*2  
WIDTH= 2.404+ 7.4636E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
658.484	238.632	238.634	-0.002	2.72
1607.268	583.191	583.183	0.008	3.64
2371.165	860.564	860.582	-0.018	4.21
4465.037	1620.735	1620.897	-0.162	6.02
7201.692	2614.533	2614.517	0.016	7.60

Pulser equivalent energies: 264.31 2591.10

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
658.47	2.7	238.63	87451.	10	1.722E+00	1.1		
664.97	2.8	240.99	8105.	10	1.727E+00	3.7		
1607.27	3.6	583.18	25352.	8	1.679E+00	1.3		
2004.19	3.9	727.32	4460.	8	1.675E+00	2.0		
2371.17	4.2	860.58	2663.	8	1.739E+00	2.0		
4465.01	5.7	1620.89	490.	9	1.726E+00	6.6		
7201.68	7.7	2614.51	7221.	8	1.695E+00	1.9		
							1.702E+00	0.7

QUALITY FILE ENTRIES																	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
121704	0731	238.6	2.7	1.71E+00	0.6	10	583.2	3.6	1.68E+00	0.8	8	860.6	4.1	1.75E+00	3.3	8	
122104	0840		2.7	1.72E+00	0.7	10		3.6	1.69E+00	1.1	8		4.3	1.73E+00	2.1	8	
123004	0803		2.7	1.71E+00	0.6	10		3.6	1.67E+00	1.4	8		4.3	1.77E+00	2.0	8	
010305	0846		2.7	1.71E+00	0.7	10		3.6	1.66E+00	1.1	8		4.4	1.67E+00	2.1	8	
010805	1015		2.7	1.71E+00	1.1	10		3.6	1.68E+00	1.2	8		4.3	1.66E+00	2.1	8	
012205	0718		2.7	1.72E+00	1.1	10		3.6	1.68E+00	1.3	8		4.2	1.74E+00	2.0	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE	%ERR	LPEQ	HPEQ
121704	0731	1620.7	5.6	1.68E+00	7.4	9	2614.5	7.6	1.67E+00	1.8	8	-1.07	0.363	1.6924E+00	0.5	264.3	2591.1
122104	0840		5.7	1.70E+00	5.4	8		7.6	1.67E+00	2.1	8	-1.09	0.363	1.7041E+00	0.5	264.2	2590.9
123004	0803		5.6	1.78E+00	6.4	8		7.5	1.68E+00	1.6	8	-1.15	0.363	1.7003E+00	0.5	264.3	2591.1
010305	0846		6.1	1.66E+00	8.3	8		7.5	1.69E+00	2.1	8	-1.08	0.363	1.6913E+00	0.5	264.4	2591.0
010805	1015		5.9	1.63E+00	6.9	9		7.4	1.69E+00	2.2	8	-1.24	0.363	1.6942E+00	0.7	264.2	2590.7
012205	0718		5.7	1.73E+00	6.6	9		7.7	1.69E+00	1.9	8	-1.22	0.363	1.7024E+00	0.7	264.3	2591.1

```
ZERO= -1.0980
ENERGY= -0.0864+ 0.36317(X)+-8.70134E-09(X)**2
WIDTH= 2.428+ 6.8202E-04(X)
```

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
658.425	238.632	238.632	0.000	2.71
668.425	583.191	583.191	0.000	3.62
1607.225	860.564	860.555	0.009	4.34
2371.027	1620.735	1620.773	-0.038	5.15
4401.645	2614.533	2614.530	0.003	7.44
7201.740				

Pulser equivalent energies: 264.18 2591.03

## RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRIES	%ERROR
658.42	2.7	238.63	86636.	10	1.704E+00	1.1		
664.92	2.7	240.99	8086.	10	1.722E+00	3.8		
1607.23	3.6	583.19	25096.	8	1.661E+00	1.0		
2004.15	3.9	727.33	4543.	8	1.705E+00	1.5		
2371.03	4.3	860.56	2648.	8	1.728E+00	2.1		
4464.65	5.2	1620.77	462.	8	1.625E+00	5.5		
7201.74	7.4	2614.53	6954.	8	1.632E+00	1.7	1.673E+00	0.6

QUALITY FILE ENTRIES

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
012205	0718	238.6	2.7	1.72E+00	1.1	10	583.2	3.6	1.69E+00	1.3	8	860.6	4.2	1.74E+00	2.0	8
012205	0718		2.7	1.69E+00	0.5	10		3.6	1.64E+00	0.8	8		4.3	1.73E+00	2.3	8
020505	0718		2.8	1.73E+00	0.9	10		3.6	1.67E+00	1.0	8		4.3	1.71E+00	2.1	8
020905	0802		2.7	1.71E+00	0.6	10		3.6	1.66E+00	0.8	8		4.3	1.70E+00	2.1	8
021705	0943		2.7	1.71E+00	1.1	10		3.6	1.69E+00	1.1	8		4.4	1.72E+00	2.0	8
022505	0732		2.7	1.70E+00	1.1	10		3.6	1.66E+00	1.0	8		4.3	1.73E+00	2.1	8
012205	0718	1620.7	5.7	1.73E+00	6.6	9	2614.5	7.7	1.69E+00	1.9	8	-1.22	0.363	1.7024E+00	0.7	264.3
012905	0723		6.2	1.63E+00	5.7	8		7.7	1.68E+00	1.6	8	-1.23	0.363	1.6765E+00	0.4	264.3
020505	0718		5.5	1.79E+00	5.2	8		7.5	1.68E+00	2.4	8	-1.15	0.363	1.7014E+00	0.6	264.1
020905	0802		5.9	1.79E+00	5.4	8		7.6	1.67E+00	2.0	8	-1.05	0.363	1.6895E+00	0.5	264.0
021705	0943		6.0	1.75E+00	5.4	8		7.7	1.72E+00	2.0	8	-1.12	0.363	1.7066E+00	0.7	263.9
022505	0732		5.2	1.63E+00	5.5	8		7.4	1.63E+00	1.7	8	-1.10	0.363	1.6730E+00	0.6	264.2

TH-228 CALIBRATION 29-MAR-05 08:13  
DETECTOR SYSTEM: A6

ZERO= -1.2799  
ENERGY= -0.0636+ 0.36319(X)+-7.68543E-09(X)\*\*2  
WIDTH= 2.408+ 7.2160E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
658.513	238.632	238.633	-0.001	2.71
1607.240	583.191	583.185	0.005	3.63
2371.078	860.564	860.580	-0.016	4.30
4464.686	1620.735	1620.848	-0.113	5.60
7201.323	2614.533	2614.522	0.011	7.56

Pulser equivalent energies: 264.08 2590.90

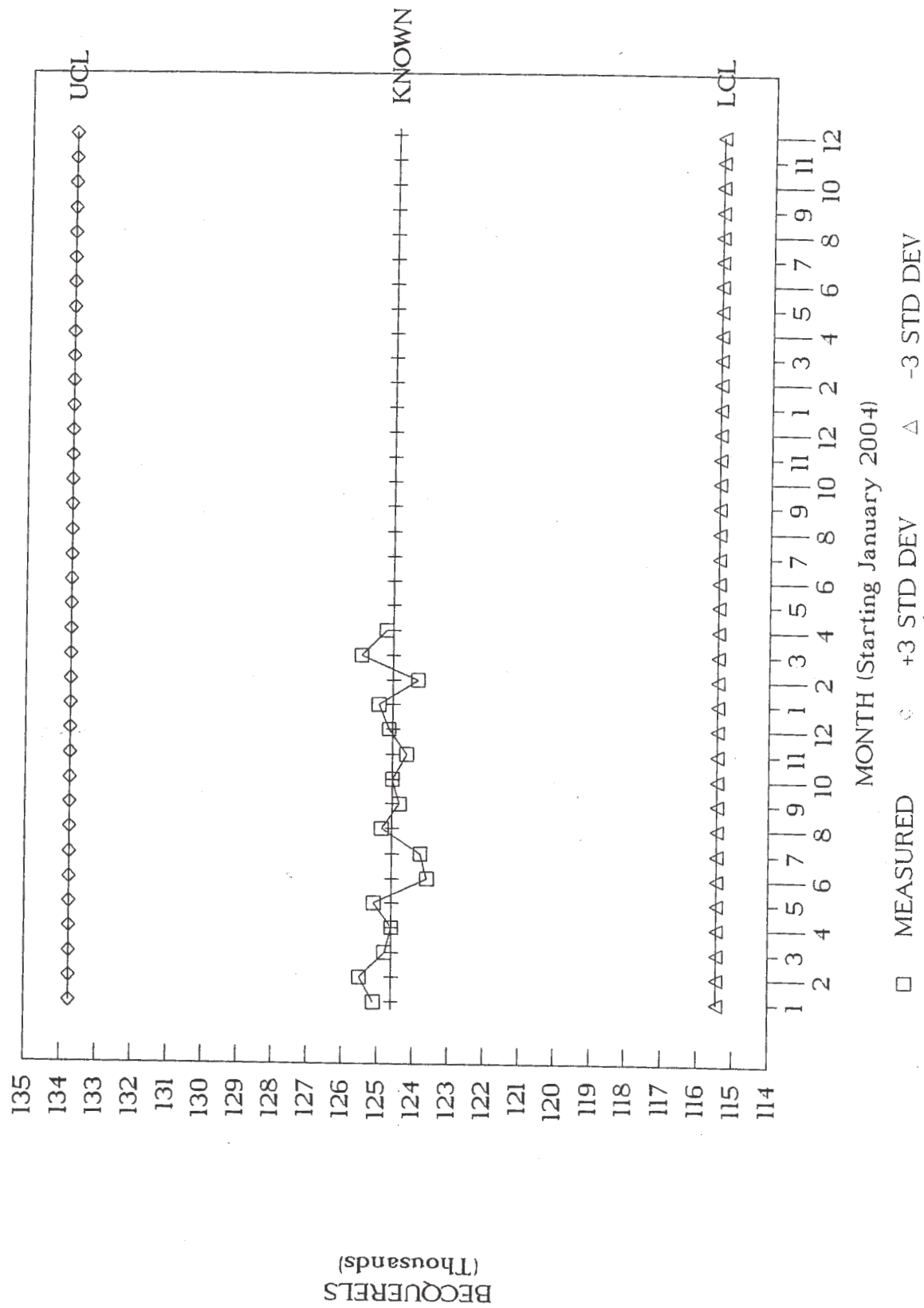
# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 7

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRENIES	%ERROR
658.50	2.7	238.63	87505.	10	1.720E+00	1.0		
664.98	2.7	240.98	8085.	10	1.720E+00	3.5		
1607.24	3.6	583.19	25372.	8	1.678E+00	1.0		
2004.17	3.9	727.34	4500.	8	1.689E+00	2.1		
2371.08	4.3	860.58	2670.	8	1.743E+00	2.1		
4464.68	5.6	1620.85	479.	8	1.688E+00	5.5		
7201.32	7.6	2614.52	7059.	8	1.658E+00	1.9	1.692E+00	0.6

QUALITY FILE ENTRIES												
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
022505	0732	238.6	2.7	1.70E+00	1.1	10	583.2	3.6	1.66E+00	1.0	8	
022605	0755		2.8	1.70E+00	0.8	10		3.6	1.66E+00	0.7	8	
030405	0739		2.7	1.69E+00	0.3	10		3.6	1.67E+00	0.7	8	
031205	0744		2.7	1.70E+00	0.4	10		3.6	1.68E+00	1.4	8	
032205	0805		2.7	1.72E+00	0.8	10		3.6	1.67E+00	1.0	8	
032905	0813		2.7	1.72E+00	1.0	10		3.6	1.68E+00	1.0	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
022505	0732	1620.7	5.2	1.63E+00	5.5	8	2614.5	7.4	1.63E+00	1.7	8	
022605	0755		5.5	1.71E+00	5.4	8		7.5	1.70E+00	1.7	8	
030405	0739		5.9	1.58E+00	5.8	8		7.7	1.64E+00	2.6	8	
031205	0744		5.8	1.76E+00	5.3	8		7.5	1.68E+00	1.9	8	
032205	0805		5.4	1.74E+00	5.7	8		7.4	1.65E+00	2.0	8	
032905	0813		5.6	1.69E+00	5.5	8		7.6	1.66E+00	1.9	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE	%ERR	LPEQ	HPEQ
022505	0732						-1.10	0.363	1.6730E+00	0.6	264.2	2591.0
022605	0755						-1.11	0.363	1.6830E+00	0.5	264.3	2591.1
030405	0739						-1.17	0.363	1.6816E+00	0.3	264.1	2590.8
031205	0744						-1.18	0.363	1.6913E+00	0.4	264.0	2590.7
032205	0805						-1.16	0.363	1.6872E+00	0.6	264.1	2590.8
032905	0813						-1.28	0.363	1.6919E+00	0.6	264.1	2590.9

# A6 (PG-13) CALIBRATION SOURCE CHECK

EU-152 (NIST 4218-E-49)



# **RADIATION MEASUREMENTS LABORATORY**

## **Supporting QA/QC Date**

### **AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS**

For: RML Ge Detector System: D4, Model No. PG-30

#### **INTERNAL QC CHECKS:**

Gamma-ray energy calibration (Daily or prior to detector use, pulsar equivalents are determined weekly for pulsar based detector systems).

Monthly instrument background check.

Monthly Eu-152 calibration source check.

#### **EXTERNAL QC CHECKS (when applicable):**

Mixed Analyte Performance Evaluation Program (MAPEP)

**SEE RESULTS FOR RML EXTERNAL QC CHECKS IN APPENDIX D**

Analyzed by: \_\_\_\_\_ Date: \_\_\_\_\_

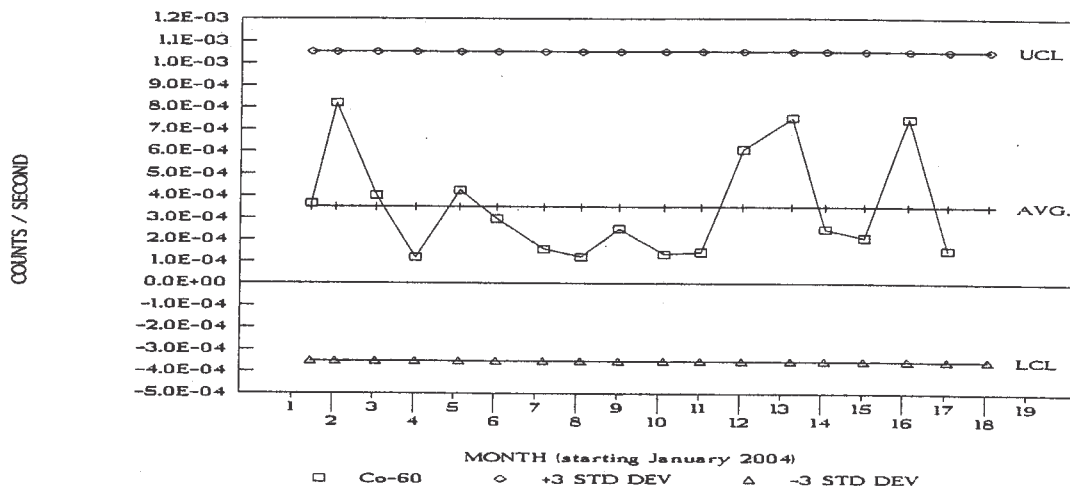
Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

#### **COMMENTS:**

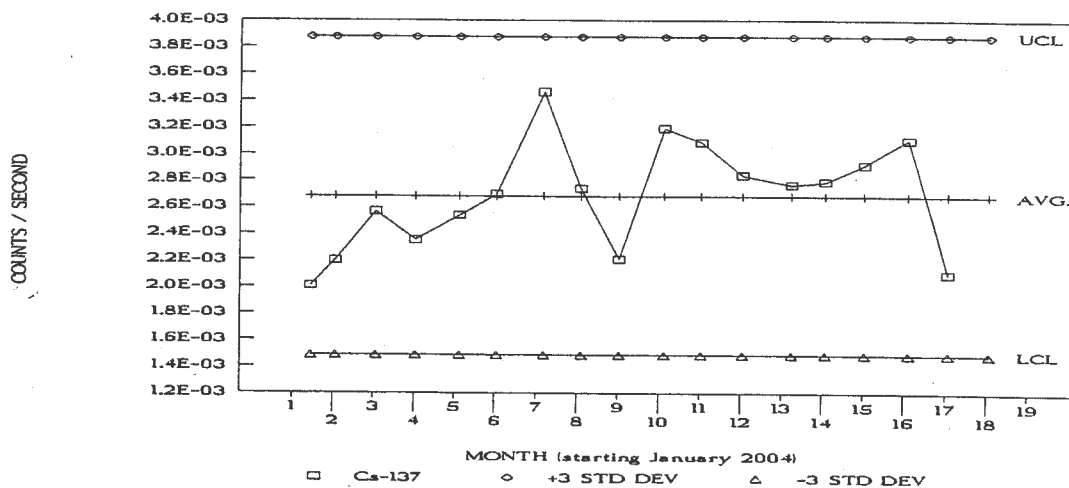
All applicable QA/QC checks demonstrate the RML was "in control" during the time frame the samples were counted and analyzed.

# RADIATION MEASUREMENTS LABORATORY

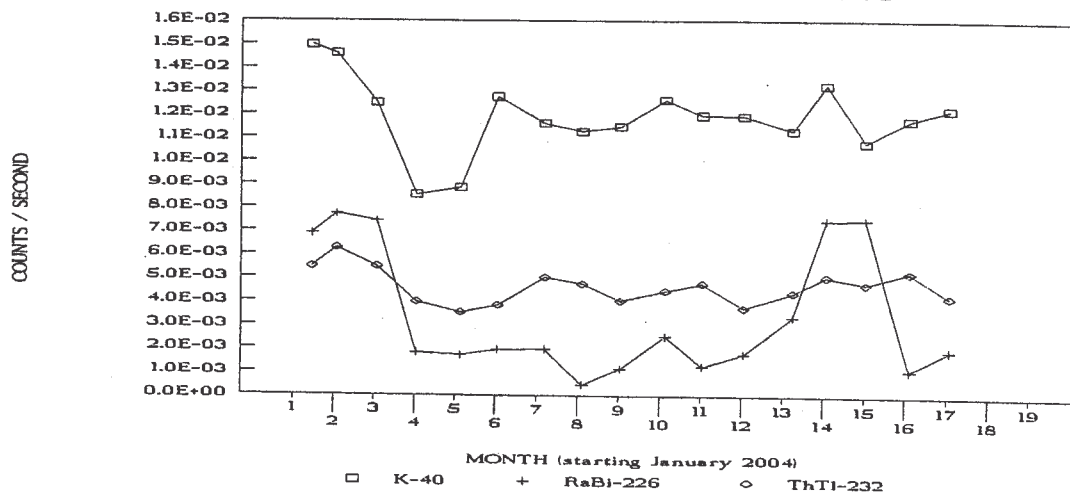
D4 (PG-30) Co-60 AMBIENT BACKGROUND



D4 (PG-30) Cs-137 AMBIENT BACKGROUND



D4 (PG-30) NATURAL ACTIVITY BACKGROUND





```
ZERO= 1.0125
ENERGY= -0.0017+ 0.36382(X)+-2.16486E-09(X)**2
WIDTH= 3.281+ 5.3263E-04(X)
```

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.914	238.632	238.635	-0.003	3.59
1601.958	583.191	583.182	-0.009	4.15
2368.481	860.564	860.595	-0.031	4.62
4454.287	1620.735	1620.874	-0.139	5.57
7185.633	2614.533	2614.518	0.015	7.13

RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES	%ERROR	NET MICROCURRENIES	%ERROR
654.90	3.5	238.63	107205.	10	1.728E+00	0.5		
661.36	3.5	240.98	9816.	10	1.713E+00	1.8		
1601.96	4.2	583.18	31197.	8	1.658E+00	0.6		
1998.13	4.4	727.32	5650.	10	1.704E+00	1.5		
2364.46	4.6	860.59	3271.	8	1.714E+00	1.8		
4454.11	5.8	1620.81	609.	9	1.693E+00	5.7		
7185.61	7.2	2614.51	9068.	8	1.696E+00	1.2	1.719E+00	0.4

"A" OF WIDTH EQUATION IS NOT IN AGREEMENT

A* OF WIDTH EQUATION IS NOT IN AGREEMENT	
AVERAGE VALUE=	2.968480
STD DEV=	3.1086989E-02
CURRENT VALUE=	3.281138
QUALITY FLAG VALUE=	10.05753

		QUALITY FILE ENTRIES															
TIME	DATE	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
0801	083104	238.6	3.2	1.74E+00	0.4	10	583.2	3.9	1.66E+00	0.6	8	860.6	4.4	1.73E+00	1.9	8	
0801	090804	1653	3.2	1.73E+00	0.4	10		3.9	1.67E+00	0.9	8		4.5	1.71E+00	2.4	8	
0800	091404	0800	3.2	1.73E+00	0.5	10		4.0	1.68E+00	0.6	8		4.4	1.71E+00	3.4	9	
0817	092104	0817	3.2	1.72E+00	0.6	10		4.0	1.66E+00	0.6	8		4.4	1.66E+00	1.9	8	
0801	092804	0801	3.2	1.72E+00	0.5	10		3.9	1.67E+00	0.7	8		4.5	1.74E+00	1.9	8	
0829	100404	0829	3.5	1.73E+00	0.5	10		4.2	1.66E+00	0.6	8		4.6	1.71E+00	1.8	8	
TIME	DATE	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES	%ERR	LPEQ	HPEQ
0801	083104	1620.7	5.2	1.83E+00	4.3	10	2614.5	7.3	1.71E+00	1.1	8	1.12	0.364	1.7209E+00	0.4	259.1	2388.4
1653	090804		5.2	1.76E+00	5.7	8		7.0	1.64E+00	3.0	9	1.10	0.364	1.7829E+00	0.4	259.2	2389.0
0800	091404	0800	5.7	1.75E+00	4.6	8		7.3	1.75E+00	1.5	8	1.21	0.364	1.7141E+00	0.4	259.2	2389.2
0817	092104	0817	6.0	1.86E+00	4.5	8		7.3	1.71E+00	1.6	8	0.99	0.364	1.6919E+00	0.4	259.2	2388.5
0801	092804	0801	5.8	1.73E+00	4.8	8		7.3	1.72E+00	1.1	8	1.00	0.364	1.7086E+00	0.4	259.2	2388.8
0829	100404	0829	5.9	1.69E+00	5.7	9		7.2	1.70E+00	1.2	8	1.01	0.364	1.7185E+00	0.4	259.2	2388.6

Th-228 CALIBRATION 09-NOV-04 08:23  
DETECTOR SYSTEM: D4

ZERO= 1.1412  
ENERGY= -0.0228+ 0.36380(X)+-3.54002E-09(X)\*\*2  
WIDTH= 3.037+ 5.9610E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.876	238.632	238.633	-0.001	3.30
1601.994	583.191	583.185	0.006	3.97
2364.599	860.564	860.608	-0.044	4.46
4454.149	1620.735	1620.731	0.004	6.03
7186.194	2614.533	2614.531	0.002	7.12

Pulser equivalent energies: 259.17 2588.61

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRENIES		%ERROR	NET MICROCURRENIES		%ERROR						
					WIDTH	ENERGY		WIDTH	ENERGY							
654.86	3.3	238.63	107405.	10	1.725E+00	1.725E+00	0.4									
661.34	3.3	240.99	9873.	10	1.716E+00	1.716E+00	1.4									
1601.99	4.0	583.18	31650.	8	1.676E+00	1.676E+00	0.6									
1998.21	4.1	727.32	5651.	8	1.698E+00	1.698E+00	1.4									
2364.61	4.5	860.61	3279.	8	1.714E+00	1.714E+00	1.9									
4454.29	5.7	1620.78	582.	8	1.613E+00	1.613E+00	8.4									
7186.19	7.1	2614.53	9178.	8	1.712E+00	1.712E+00	1.6									
					1.709E+00		0.3									
QUALITY FILE ENTRIES																
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	QUALITY FILE ENTRIES		FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG		
							WIDTH	ENERGY								
100404	0829	238.6	3.5	1.73E+00	0.5	10	583.2	4.2	1.66E+00	0.6	8	860.6	4.6	1.71E+00	1.8	8
101204	0832		3.3	1.72E+00	0.5	10	4.0	1.65E+00	0.6	8	4.4	1.72E+00	1.9	8		
101904	0726		3.2	1.72E+00	0.3	10	4.0	1.67E+00	0.6	8	4.4	1.69E+00	1.9	8		
102604	0818		3.3	1.73E+00	0.5	10	3.9	1.68E+00	1.3	8	4.3	1.80E+00	1.8	8		
110204	0808		3.3	1.72E+00	0.4	10	3.9	1.68E+00	0.6	8	4.4	1.76E+00	1.9	8		
110904	0823		3.3	1.72E+00	0.4	10	4.0	1.68E+00	0.6	8	4.5	1.71E+00	1.9	8		
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	QUALITY FILE ENTRIES		FLAG	ZERO	GAIN	NET UCURIE	%ERR	LPEQ	HPEQ	
							WIDTH	ENERGY								
100404	0829	1620.7	5.8	1.69E+00	5.7	9	2614.5	7.2	1.70E+00	1.2	8	1.01	0.364	1.7185E+00	0.4	259.2 2588.6
101204	0832		6.1	1.82E+00	4.7	8	7.3	1.71E+00	1.9	8	1.07	0.364	1.7210E+00	0.5	259.2 2588.6	
101904	0726		5.8	1.69E+00	4.8	8	7.3	1.71E+00	1.1	8	1.08	0.364	1.7195E+00	0.3	259.2 2588.6	
102604	0818		6.0	1.73E+00	4.7	8	7.3	1.70E+00	1.9	9	1.06	0.364	1.7196E+00	0.4	259.2 2588.8	
110204	0808		5.6	1.60E+00	6.4	8	7.1	1.71E+00	1.1	8	1.11	0.364	1.7107E+00	0.3	259.1 2588.5	
110904	0823		5.7	1.61E+00	8.4	8	7.1	1.71E+00	1.6	8	1.14	0.364	1.7095E+00	0.3	259.2 2588.6	

Th-228 CALIBRATION 10-DEC-04 07:46  
DETECTOR SYSTEM: D4

ZERO= 1.1989  
ENERGY= 0.0111+ 0.36335(X)+-8.34187E-10(X)\*\*2  
WIDTH= 2.949+ 5.8965E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
655.541	238.632	238.636	-0.004	3.28
1603.796	583.191	583.181	0.010	3.93
2367.277	860.564	860.589	-0.025	4.31
4459.774	1620.735	1620.882	-0.147	5.71
7194.498	2614.533	2614.513	0.020	7.12

Pulser equivalent energies: 258.68 2583.98

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
655.52	3.2	238.63	107688.	10	1.729E+00	0.6		
661.98	3.3	240.98	9980.	10	1.735E+00	2.1		
1603.80	3.9	583.18	31511.	8	1.670E+00	0.7		
2000.48	4.2	727.32	5617.	8	1.689E+00	1.4		
2367.28	4.3	860.59	3175.	8	1.660E+00	2.1		
4459.77	5.7	1620.88	623.	8	1.729E+00	4.8		
7194.48	7.2	2614.51	9366.	8	1.748E+00	1.3		
					1.709E+00	0.4		

"B" OF ENERGY EQUATION IS NOT IN AGREEMENT  
AVERAGE VALUE= 0.3637984 STD DEV= 1.7871977E-05  
CURRENT VALUE= 0.3633485 QUALITY FLAG VALUE= 25.17326

QUALITY FILE ENTRIES									
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
110904	0823	238.6	3.3	1.72E+00	0.4	10	583.2	4.0	1.68E+00
111604	0749		3.3	1.74E+00	0.5	10		3.9	1.66E+00
112304	0832		3.3	1.73E+00	0.5	10		3.9	1.66E+00
113004	0800		3.3	1.73E+00	0.5	10		4.0	1.67E+00
120804	0818		3.2	1.72E+00	0.4	10		3.9	1.67E+00
121004	0746		3.2	1.73E+00	0.6	10		3.9	1.67E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
110904	0823	1620.7	5.7	1.61E+00	8.4	8	2614.5	7.1	1.71E+00
111604	0749		5.3	1.73E+00	5.1	8		7.3	1.72E+00
112304	0832		5.6	1.74E+00	5.8	8		7.1	1.70E+00
113004	0800		5.3	1.72E+00	4.6	8		7.4	1.75E+00
120804	0818		5.7	1.81E+00	4.7	8		7.1	1.69E+00
121004	0746		5.7	1.73E+00	4.8	8		7.2	1.75E+00
QUALITY FILE ENTRIES									
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
110904	0823	1620.7	5.7	1.61E+00	8.4	8	2614.5	7.1	1.71E+00
111604	0749		5.3	1.73E+00	5.1	8		7.3	1.72E+00
112304	0832		5.6	1.74E+00	5.8	8		7.1	1.70E+00
113004	0800		5.3	1.72E+00	4.6	8		7.4	1.75E+00
120804	0818		5.7	1.81E+00	4.7	8		7.1	1.69E+00
121004	0746		5.7	1.73E+00	4.8	8		7.2	1.75E+00

ZERO	GAIN	NET UCURIE	%ERR	FLAG	UCURIES	%ERR	FLAG	LPEQ	HPEQ
1.14	0.364	1.7095E+00	0.3	8	1.71E+00	1.9	8	259.2	2588.6
1.14	0.364	1.7315E+00	0.5	8	1.74E+00	2.6	8	259.2	2588.6
1.16	0.364	1.7185E+00	0.4	8	1.75E+00	1.8	8	259.2	2588.7
1.15	0.364	1.7297E+00	0.5	8	1.68E+00	1.9	8	259.1	2588.5
1.27	0.364	1.7060E+00	0.3	8	1.68E+00	2.1	8	259.2	2589.4
1.20	0.363	1.7092E+00	0.4	8	1.66E+00	2.1	8	258.7	2584.0

Th-228 CALIBRATION 08-JAN-05 10:15  
DETECTOR SYSTEM: D4

ZERO= 1.0608  
ENERGY= -0.0089+ 0.36383(X)+-3.35670E-09(X)\*\*2  
WIDTH= 2.894+ 6.0589E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.869	238.632	238.636	-0.004	3.28
1601.883	583.191	583.180	0.011	3.96
2364.418	860.602	860.564	-0.038	4.35
4454.286	1620.735	1620.908	-0.173	5.38
7185.544	2614.533	2614.512	0.021	7.35

Pulser equivalent energies: 259.19 2589.23

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERR	NET MICROCURRIES	%ERROR
654.85	3.2	238.63	107507.	10	1.727E+00	0.5		
661.32	3.3	240.98	9914.	10	1.724E+00	1.8		
1601.88	4.0	583.18	31752.	8	1.683E+00	1.0		
1998.05	4.2	727.31	5525.	8	1.662E+00	1.4		
2364.44	4.4	860.61	3400.	8	1.778E+00	1.8		
4454.30	5.5	1620.91	630.	8	1.750E+00	4.6		
7185.54	7.3	2614.51	9102.	8	1.700E+00	1.2		
							1.714E+00	0.4

QUALITY FILE ENTRIES												
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
12121004	0746	238.6	3.2	1.73E+00	0.6	10	583.2	3.9	1.67E+00	0.7	8	
12121704	0732		3.2	1.73E+00	0.5	10		3.9	1.68E+00	0.8	8	
12123004	0804		3.3	1.73E+00	0.4	10		4.0	1.66E+00	0.6	8	
010305	0847		3.2	1.73E+00	0.5	10		4.0	1.67E+00	0.6	8	
010705	1701		3.3	1.73E+00	0.4	10		3.9	1.68E+00	0.7	8	
010805	1015		3.2	1.73E+00	0.5	10		4.0	1.68E+00	1.0	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
12121004	0746	1620.7	5.7	1.73E+00	4.8	8	2614.5	7.2	1.75E+00	1.3	8	
12121704	0732		5.9	1.85E+00	5.4	8		7.2	1.72E+00	1.2	8	
1223004	0804		5.6	1.61E+00	7.1	8		7.2	1.72E+00	1.5	8	
010305	0847		5.6	1.78E+00	4.9	8		7.3	1.71E+00	1.2	8	
010705	1701		6.1	1.78E+00	4.6	8		7.4	1.74E+00	1.4	8	
010805	1015		5.5	1.75E+00	4.6	8		7.3	1.70E+00	1.2	8	
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIE	%ERR	LPEQ	HPEQ
12121004	0746	1620.7	5.7	1.73E+00	4.8	8	1.20	0.363	1.7092E+00	0.4	258.7	2584.0
12121704	0732		5.9	1.85E+00	5.4	8	1.25	0.364	1.7160E+00	0.4	259.2	2588.7
1223004	0804		5.6	1.61E+00	7.1	8	1.17	0.363	1.7248E+00	0.4	258.7	2584.3
010305	0847		5.6	1.78E+00	4.9	8	1.23	0.363	1.7256E+00	0.5	258.7	2584.2
010705	1701		6.1	1.78E+00	4.6	8	1.15	0.363	1.7151E+00	0.3	258.7	2584.3
010805	1015		5.5	1.75E+00	4.6	8	1.06	0.364	1.7138E+00	0.4	259.2	2589.2

Th-228 CALIBRATION 17-FEB-05 09:44  
DETECTOR SYSTEM: D4

ZERO= 1.1809  
ENERGY= 0.0021+ 0.36377(X)+-1.32689E-09(X)\*\*2  
WIDTH= 2.991+ 6.3086E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.826	238.632	238.635	-0.003	3.28
1602.007	583.191	583.184	0.007	3.93
2364.588	860.564	860.581	-0.017	4.52
4454.693	1620.735	1620.871	-0.136	6.19
7186.365	2614.533	2614.518	0.015	7.30

Pulsar equivalent energies: 259.13 2588.40

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
654.81	3.2	238.63	107508.	10	1.727E+00	0.6		
661.30	3.3	240.99	9808.	10	1.706E+00	2.0		
1602.01	3.9	583.18	31586.	8	1.675E+00	0.7		
1998.24	4.3	727.32	5683.	8	1.711E+00	1.4		
2364.59	4.5	860.58	3308.	8	1.733E+00	1.8		
4454.74	6.0	1620.89	658.	8	1.830E+00	4.8		
7186.37	7.3	2614.52	9396.	8	1.759E+00	1.4	1.714E+00	0.4

## QUALITY FILE ENTRIES

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG
010805	1015	238.6	3.2	1.73E+00	0.5	10	583.2	4.0	1.68E+00	1.0	8
012205	0718		3.3	1.72E+00	0.6	10		3.9	1.66E+00	0.6	8
012905	0723		3.3	1.73E+00	0.5	10		3.9	1.66E+00	0.6	8
020505	0937		3.2	1.71E+00	0.5	10		3.9	1.65E+00	0.6	8
020905	0802		3.2	1.73E+00	0.6	10		3.9	1.67E+00	0.6	8
021705	0944		3.2	1.73E+00	0.6	10		3.9	1.68E+00	0.7	8

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET	UCURIE	%ERR	FLAG	HPEQ
010805	1015	1620.7	5.5	1.75E+00	4.6	8	1.06	0.364	1.7138E+00	0.4	8	259.2	2589.2
012205	0718		6.1	1.67E+00	6.1	8	1.17	0.364	1.7012E+00	0.4	8	259.1	2588.7
012905	0723		5.7	1.78E+00	4.6	8	1.15	0.364	1.7291E+00	0.5	8	259.2	2588.8
020505	0937		5.2	1.61E+00	4.8	8	1.10	0.364	1.7053E+00	0.4	8	259.2	2588.9
020905	0802		6.1	1.85E+00	5.0	8	1.23	0.364	1.7028E+00	0.4	8	259.2	2588.9
021705	0944		6.0	1.83E+00	4.8	8	1.18	0.364	1.7140E+00	0.4	8	259.1	2588.4

Th-228 CALIBRATION 22-MAR-05 08:05  
DETECTOR SYSTEM: D4

ZERO= 1.1476  
ENERGY= -0.0099+ 0.36382(X)+-3.25768E-09(X)\*\*2  
WIDTH= 2.959+ 6.0659E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.796	238.632	238.635	-0.003	3.28
1601.838	583.191	583.182	0.009	3.94
2364.429	860.564	860.618	-0.054	4.40
4454.061	1620.735	1620.824	-0.089	5.83
7185.627	2614.533	2614.522	0.011	7.22

Pulser equivalent energies: 259.16 2588.78

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
654.78	3.2	238.63	107027.	10	1.719E+00	0.7		
661.24	3.2	240.98	9928.	10	1.728E+00	2.4		
1601.84	3.9	583.18	31458.	8	1.668E+00	0.8		
1998.05	4.2	727.33	5615.	8	1.690E+00	1.4		
2364.44	4.4	860.62	3292.	8	1.723E+00	1.9		
4454.06	5.9	1620.82	659.	8	1.831E+00	4.6		
7186.00	7.3	2614.66	9203.	9	1.720E+00	3.0		
							1.701E+00	0.5

QUALITY FILE ENTRIES									
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
021705	0944	238.6	3.2	1.73E+00	0.6	10	583.2	3.9	1.68E+00
022505	0732		3.2	1.73E+00	0.5	10		4.0	1.69E+00
022605	0756		3.2	1.73E+00	0.6	10		4.0	1.67E+00
030405	0740		3.2	1.72E+00	0.6	10		4.0	1.66E+00
031205	0744		3.3	1.72E+00	0.5	10		4.0	1.67E+00
032205	0805		3.2	1.72E+00	0.7	10		3.9	1.67E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES
021705	0944	1620.7	6.0	1.83E+00	4.8	8	2614.5	7.3	1.76E+00
022505	0732		5.6	1.70E+00	4.7	8		7.2	1.72E+00
022605	0756		6.0	1.79E+00	5.1	8		7.3	1.74E+00
030405	0740		5.8	1.76E+00	4.7	8		7.3	1.73E+00
031205	0744		5.7	1.84E+00	4.6	8		7.3	1.72E+00
032205	0805		5.9	1.83E+00	4.6	8		7.3	1.72E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES
021705	0944	1620.7	6.0	1.83E+00	4.8	8	1.18	0.364	1.7140E+00
022505	0732		5.6	1.70E+00	4.7	8	1.19	0.364	1.7108E+00
022605	0756		6.0	1.79E+00	5.1	8	1.19	0.364	1.7357E+00
030405	0740		5.8	1.76E+00	4.7	8	1.19	0.364	1.7180E+00
031205	0744		5.7	1.84E+00	4.6	8	1.14	0.364	1.7023E+00
032205	0805		5.9	1.83E+00	4.6	8	1.15	0.364	1.7010E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES
021705	0944	1620.7	6.0	1.83E+00	4.8	8	1.18	0.364	1.7140E+00
022505	0732		5.6	1.70E+00	4.7	8	1.19	0.364	1.7108E+00
022605	0756		6.0	1.79E+00	5.1	8	1.19	0.364	1.7357E+00
030405	0740		5.8	1.76E+00	4.7	8	1.19	0.364	1.7180E+00
031205	0744		5.7	1.84E+00	4.6	8	1.14	0.364	1.7023E+00
032205	0805		5.9	1.83E+00	4.6	8	1.15	0.364	1.7010E+00
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES
021705	0944	1620.7	6.0	1.83E+00	4.8	8	1.18	0.364	1.7140E+00
022505	0732		5.6	1.70E+00	4.7	8	1.19	0.364	1.7108E+00
022605	0756		6.0	1.79E+00	5.1	8	1.19	0.364	1.7357E+00
030405	0740		5.8	1.76E+00	4.7	8	1.19	0.364	1.7180E+00
031205	0744		5.7	1.84E+00	4.6	8	1.14	0.364	1.7023E+00
032205	0805		5.9	1.83E+00	4.6	8	1.15	0.364	1.7010E+00

Th-228 CALIBRATION 29-MAR-05 08:13  
DETECTOR SYSTEM: D4

ZERO= 1.1633  
ENERGY= -0.0195+ 0.36383(X)+-3.28519E-09(X)\*\*2  
WIDTH= 3.038+ 5.6346E-04(X)

CHANNEL	ENERGY	CAL. ENG	D-ENG	WIDTH
654.796	238.632	238.634	-0.002	3.27
1601.836	583.191	583.185	0.006	3.94
2364.299	860.564	860.579	-0.015	4.44
4454.083	1620.735	1620.850	-0.115	5.76
7185.539	2614.533	2614.521	0.012	6.95

Pulser equivalent energies: 259.17 2588.86

# RESULTS OF PEAK ANALYSIS. THORIUM SOURCE 5

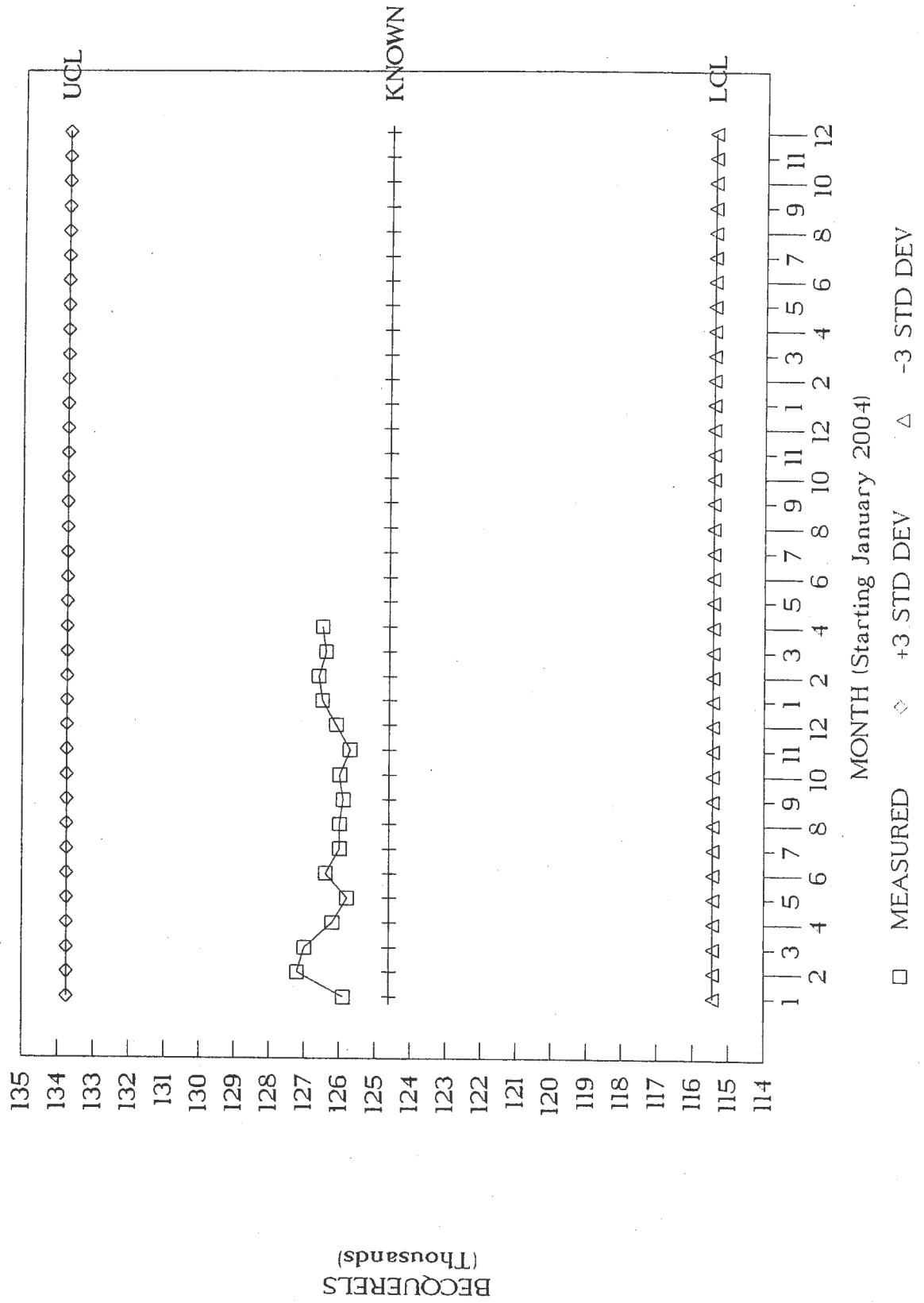
CENTROID	WIDTH	ENERGY	AREA	FLAGS	MICROCURRIES	%ERROR	NET MICROCURRIES	%ERROR
654.78	3.2	238.63	107590.	10	1.729E+00	0.6		
661.26	3.2	240.98	9738.	10	1.694E+00	2.1		
1601.84	3.9	583.18	31522.	8	1.671E+00	0.7		
1998.00	4.2	727.32	5615.	8	1.689E+00	1.4		
2364.30	4.4	860.58	3377.	8	1.767E+00	1.9		
4454.08	5.8	1620.85	599.	8	1.663E+00	4.9		
7185.50	7.0	2614.50	9013.	8	1.684E+00	1.3		
							1.700E+00	0.4

QUALITY FILE ENTRIES												
DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ENERGY	WIDTH	UCURIES	%ERR	FLAG	
022505	0732	238.6	3.2	1.73E+00	0.5	10	583.2	4.0	1.69E+00	0.6	8	
022605	0756		3.2	1.73E+00	0.6	10		4.0	1.67E+00	0.6	8	
030405	0740		3.2	1.72E+00	0.6	10		4.0	1.66E+00	0.6	8	
031205	0744		3.3	1.72E+00	0.5	10		4.0	1.67E+00	0.6	8	
032205	0805		3.2	1.72E+00	0.7	10		3.9	1.67E+00	0.8	8	
032905	0813		3.2	1.73E+00	0.6	10		3.9	1.67E+00	0.7	8	

DATE	TIME	ENERGY	WIDTH	UCURIES	%ERR	FLAG	ZERO	GAIN	NET UCURIES	%ERR	LPEQ	HPEQ
022505	0732	1620.7	5.6	1.70E+00	4.7	8	1.19	0.364	1.7108E+00	0.4	259.2	2588.7
022605	0756		6.0	1.79E+00	5.1	8	1.19	0.364	1.7357E+00	0.6	259.2	2588.7
030405	0740		5.8	1.76E+00	4.7	8	1.19	0.364	1.7180E+00	0.5	259.2	2588.8
031205	0744		5.7	1.84E+00	4.6	8	1.14	0.364	1.7023E+00	0.3	259.2	2588.9
032205	0805		5.9	1.83E+00	4.6	8	1.15	0.364	1.7010E+00	0.5	259.2	2588.8
032905	0813		5.8	1.66E+00	4.9	8	1.16	0.364	1.7004E+00	0.4	259.2	2588.9

# RML D4 (PG-30) CALIBRATION SOURCE CHECK

EU-152 MEAN (NIST 4218-E-49)





# **RADIATION MEASUREMENTS LABORATORY**

**Supporting QA/QC Date**

## **AMCHITKA ISLAND ENVIRONMENTAL ANALYSIS**

For: RML LGe (leps) Detector System: B4, Model No. CAN-41

### **INTERNAL QC CHECKS:**

Gamma-ray energy calibration (Daily or prior to detector use, pulsar equivalents are determined weekly for pulsar based detector systems).

Monthly instrument background check.

Monthly I-129 calibration source check.

### **EXTERNAL QC CHECKS (when applicable):**

Mixed Analyte Performance Evaluation Program (MAPEP)

**SEE RESULTS FOR RML EXTERNAL QC CHECKS IN APPENDIX D**

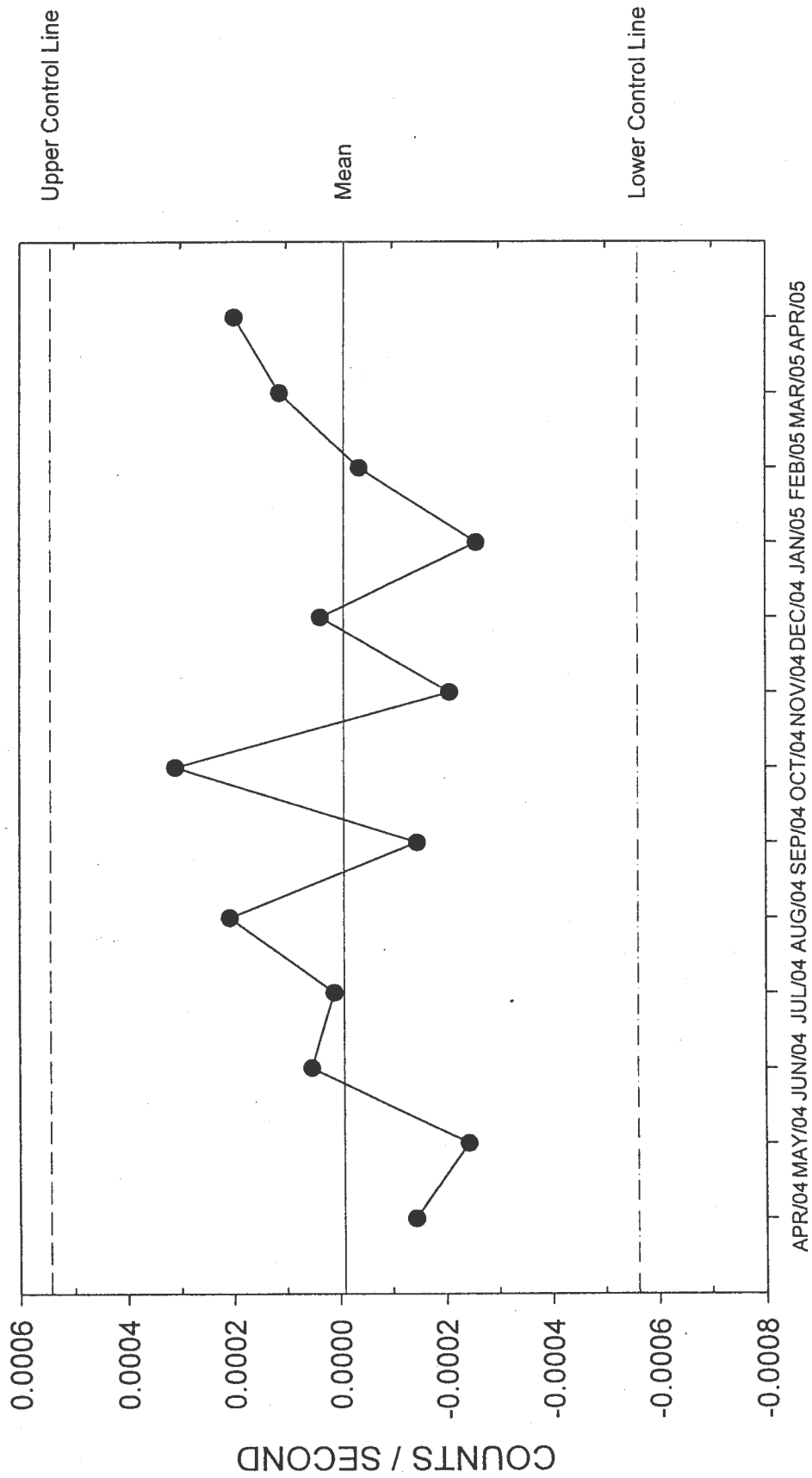
Analyzed by: \_\_\_\_\_ Date: \_\_\_\_\_

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

### **COMMENTS:**

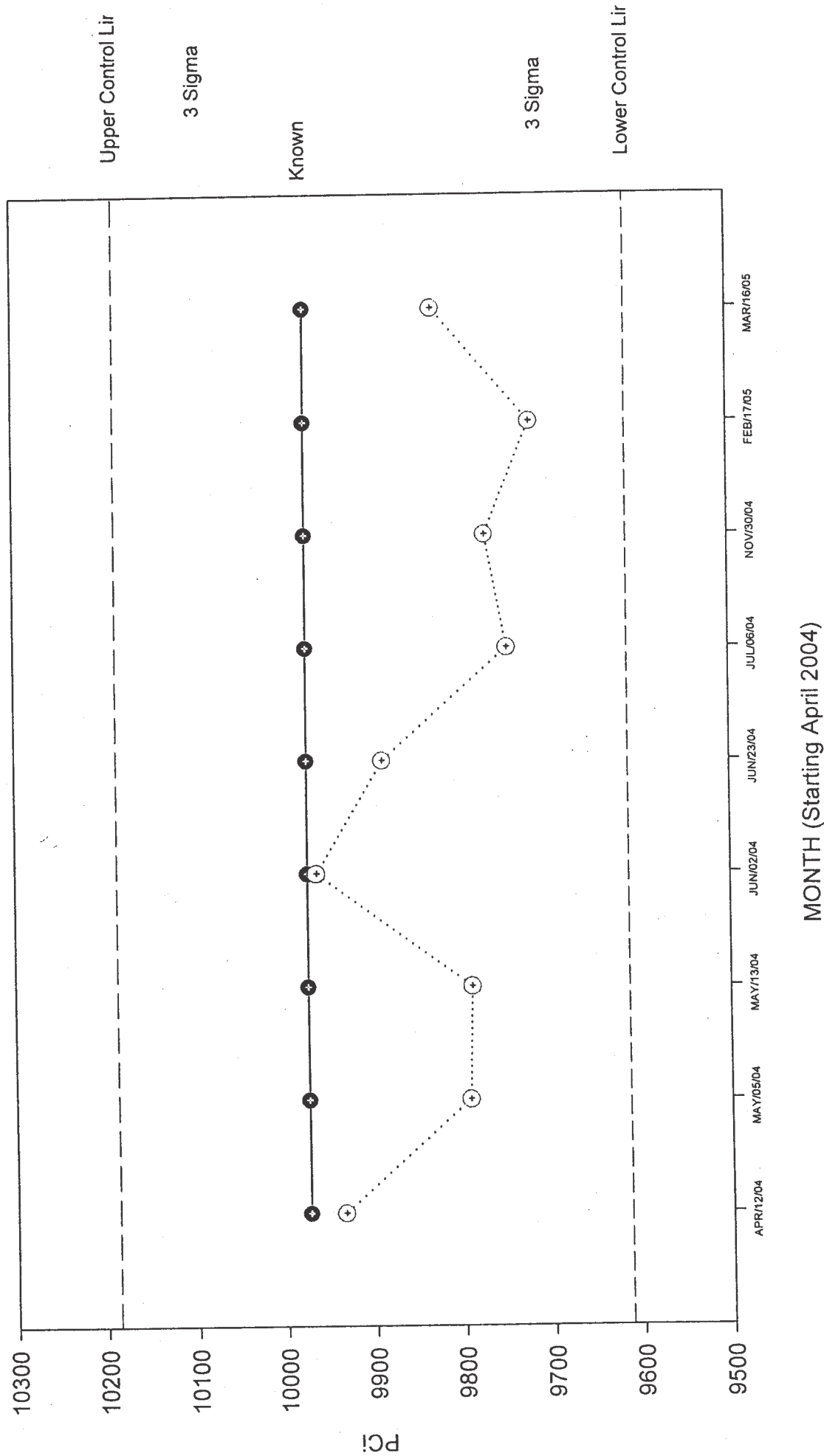
All applicable QA/QC checks demonstrate the RML was "in control" during the time frame the samples were counted and analyzed.

# RML B4 CAN-41 LEGe (NEW LEPS) AMBIENT BACKGROUND AT 39.5 KeV



- MONTH & DATE vs 39.57 KeV
- - - Plot 1 Upper Control Line
- Plot 1 Mean
- - - Plot 1 Lower Control Line

# RML B4 CAN-41 LEGe (NEW LEPS) I-129 CALIBRATION SOURCE CHECK STANDARD ID 4943 #3



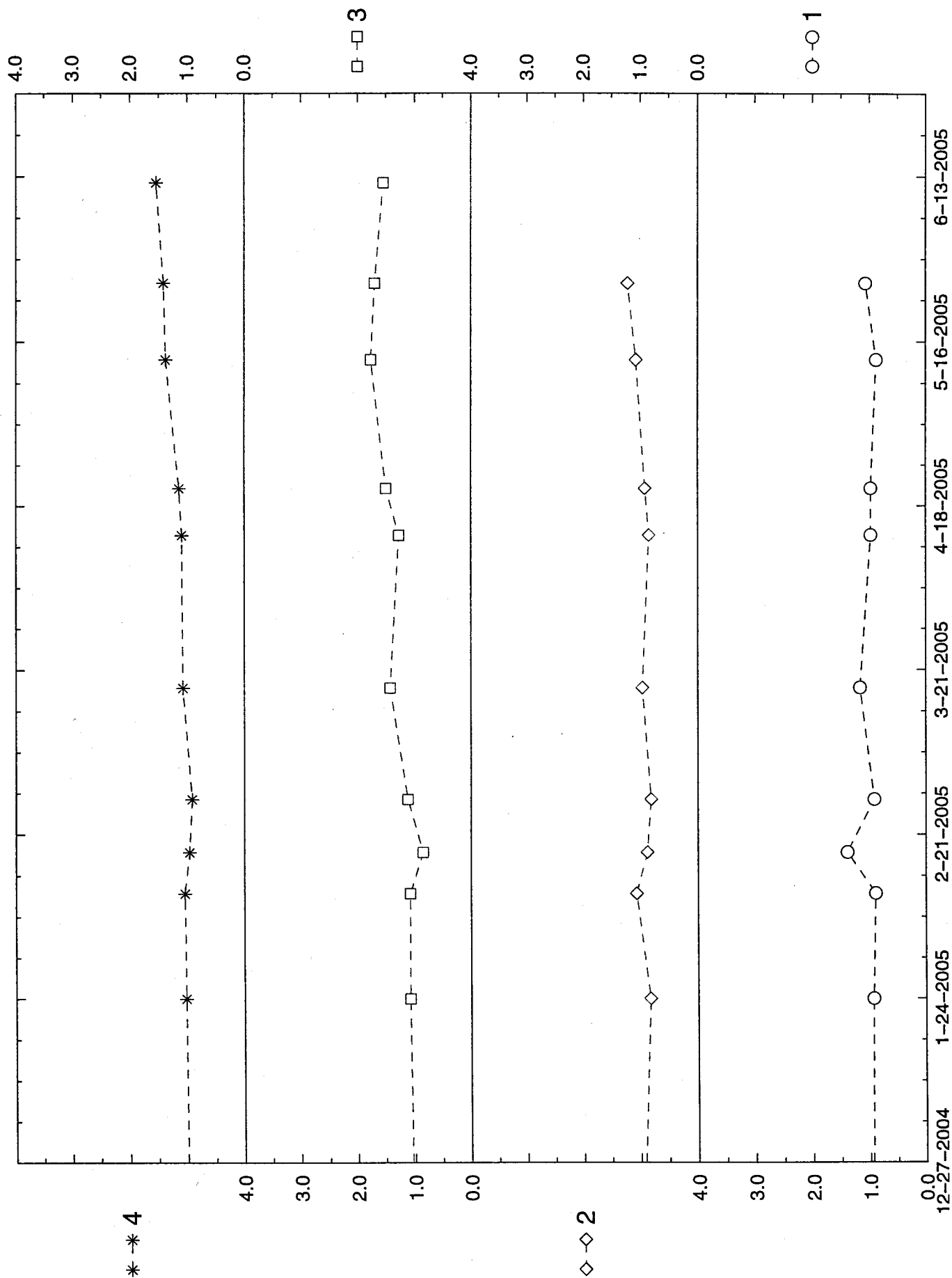
- +— MONTH & DATE vs STD Known Act.
- ...+... MONTH & DATE vs Cal Source Act.
- Plot 1 Upper Control Line
- Plot 1 Lower Control Line



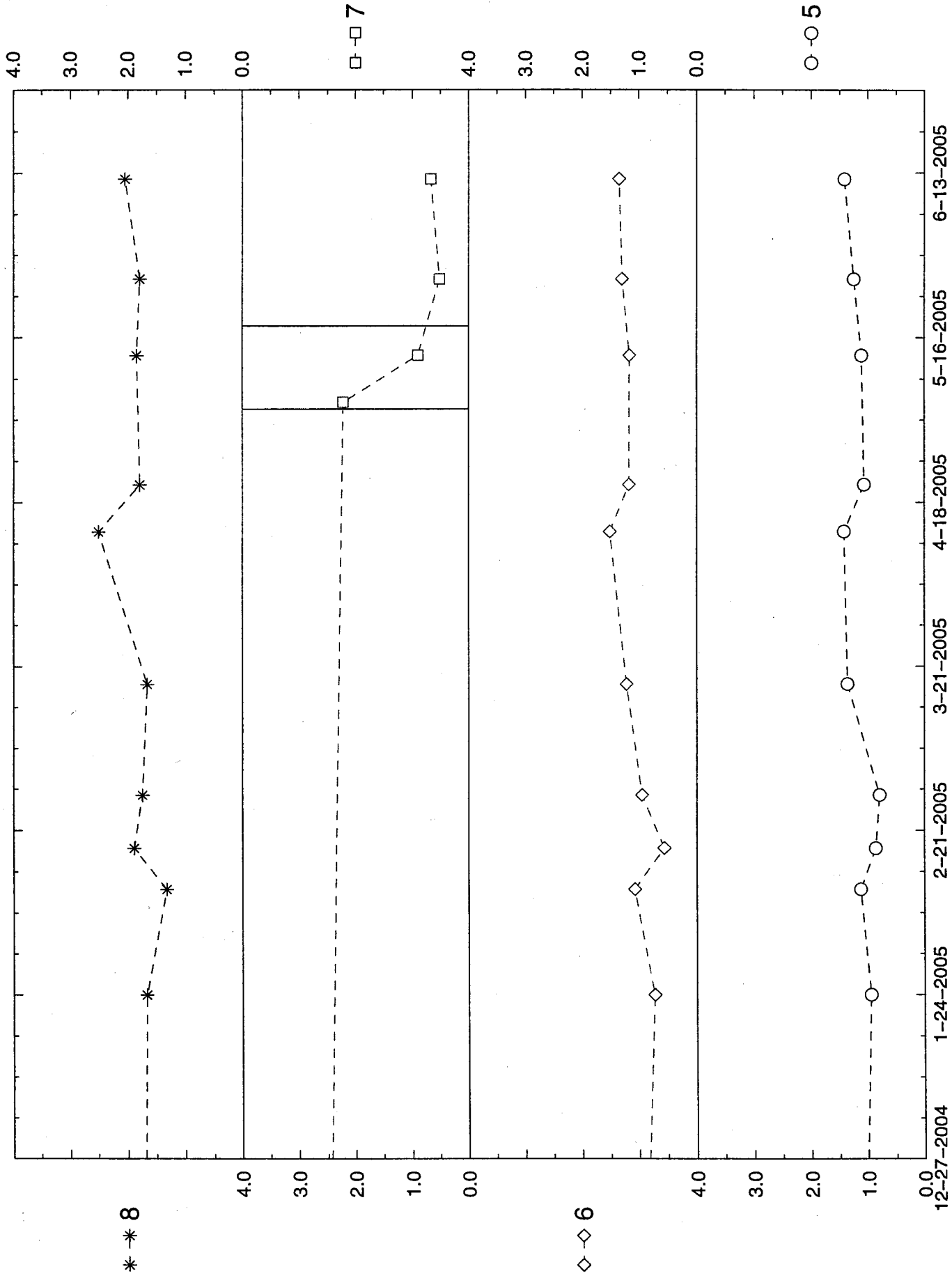
## **Appendix C-2**

### **Alpha Spectroscopy and Sr-90 Internal QA/QC Program Results**

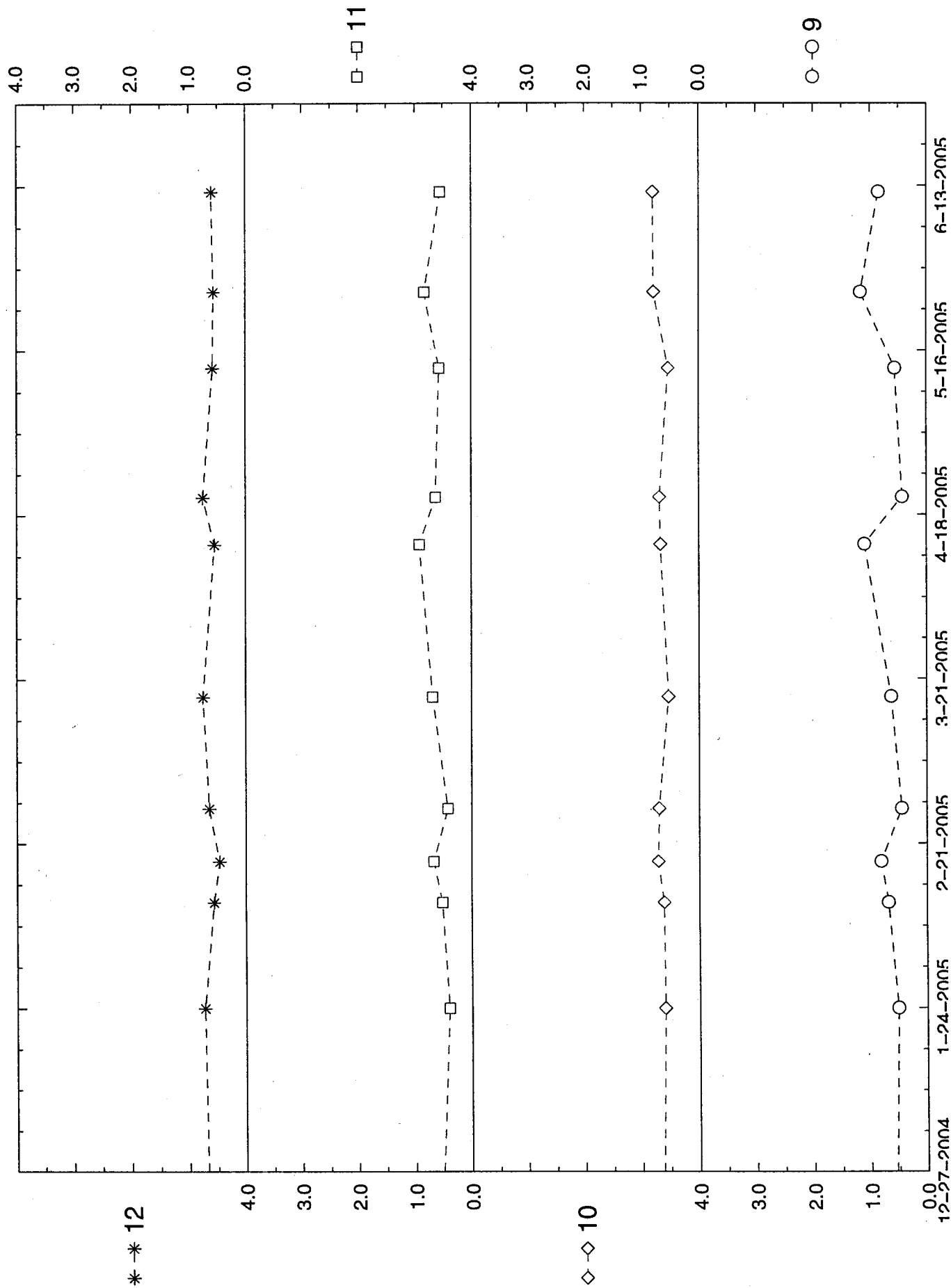
# naboo $\alpha$ Detector Background Rates: Counts per Hour



naboo  $\alpha$  Detector Background Rates: Counts per Hour

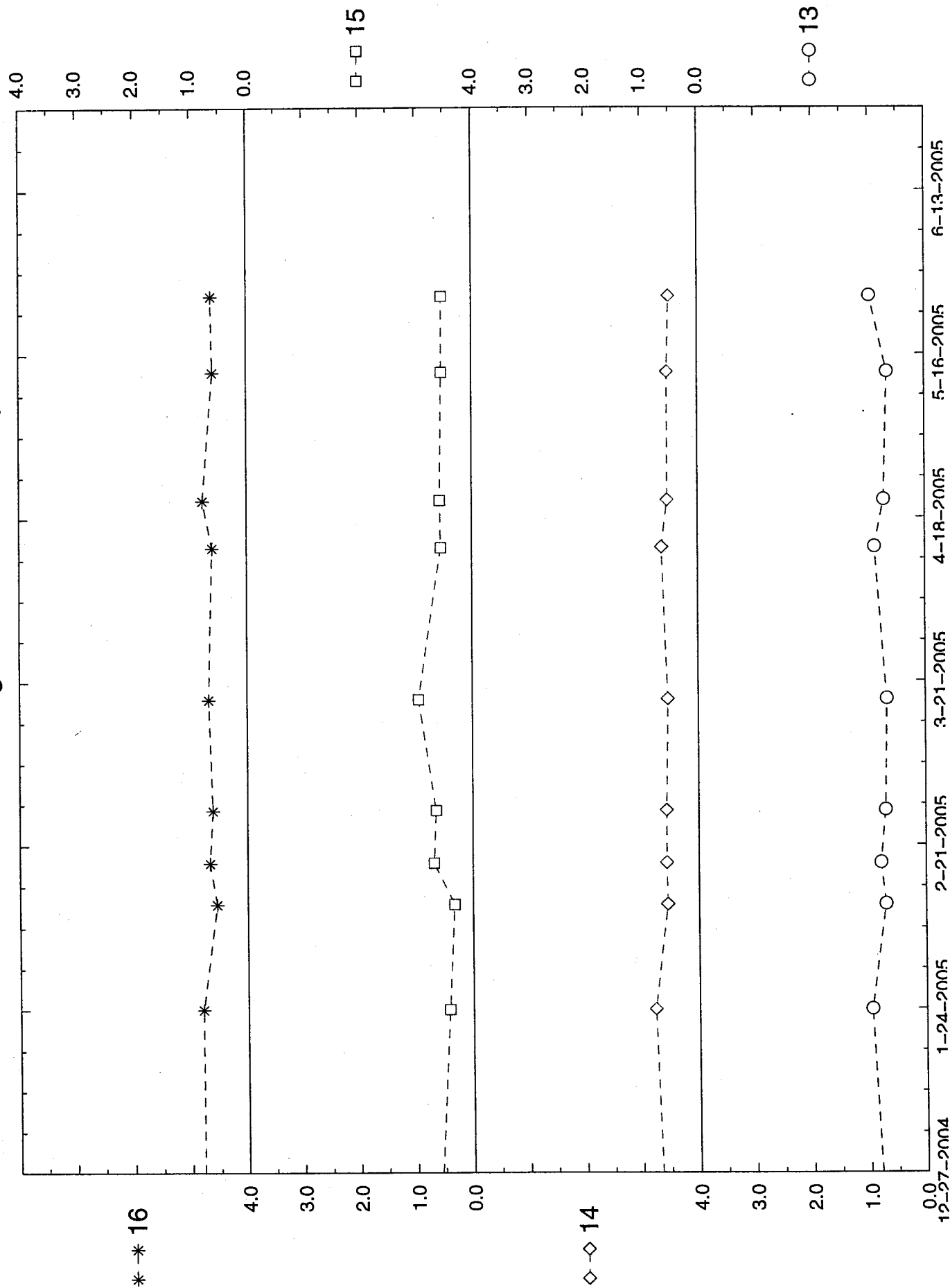


naboo  $\alpha$  Detector Background Rates: Counts per Hour



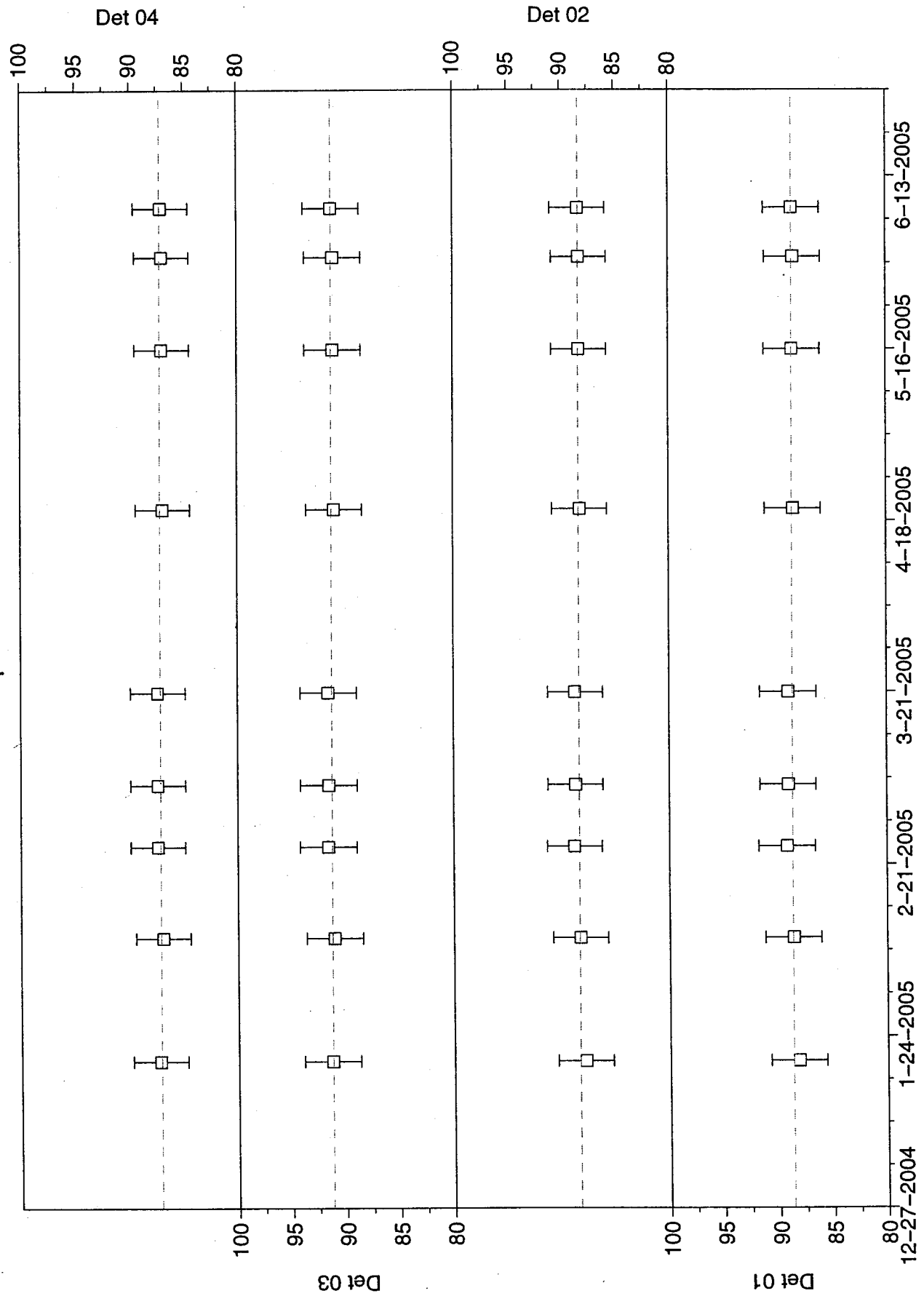


# naboo $\alpha$ Detector Background Rates: Counts per Hour



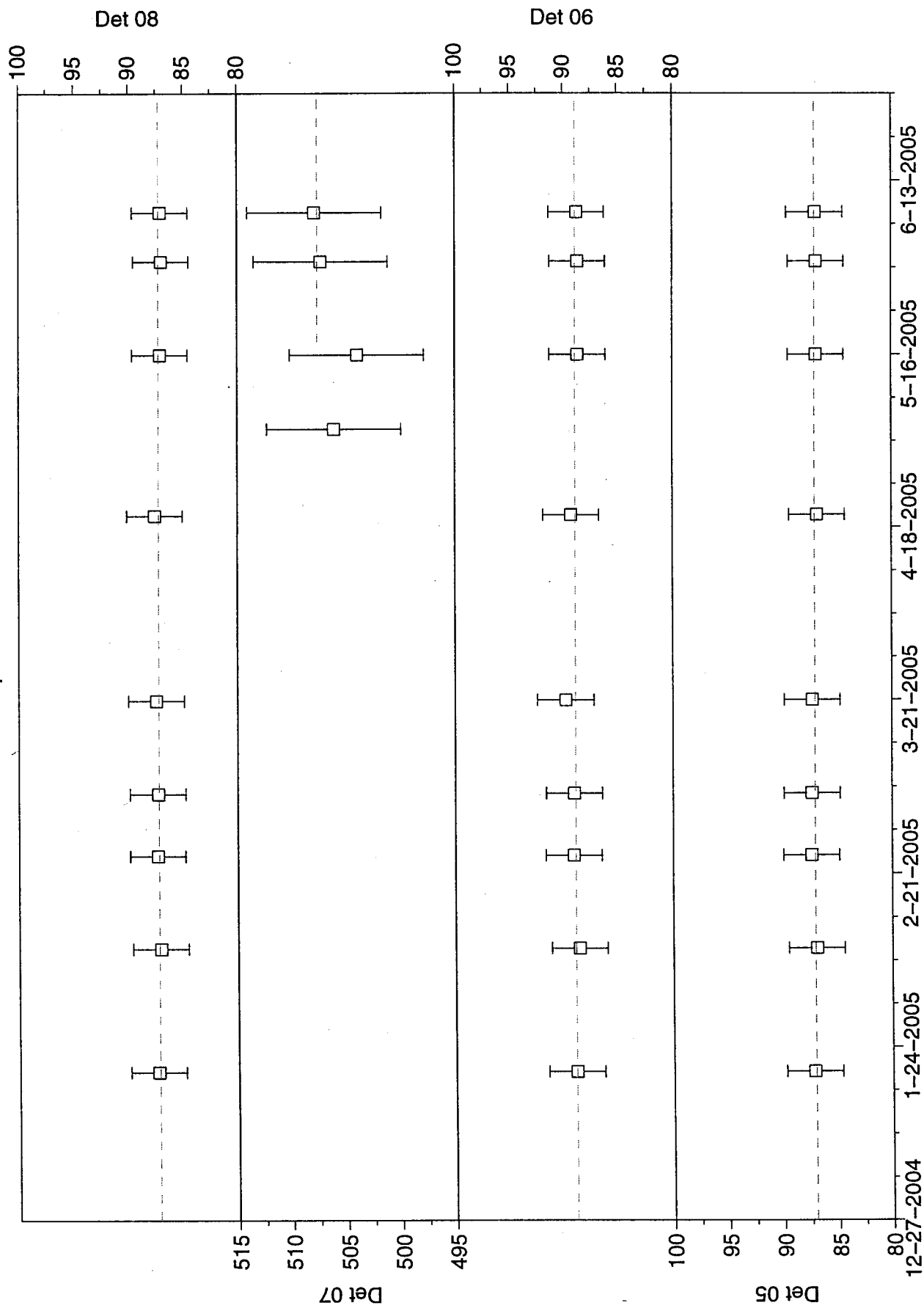
# naboo $\alpha$ QC Pulser Check

Pulses per Second



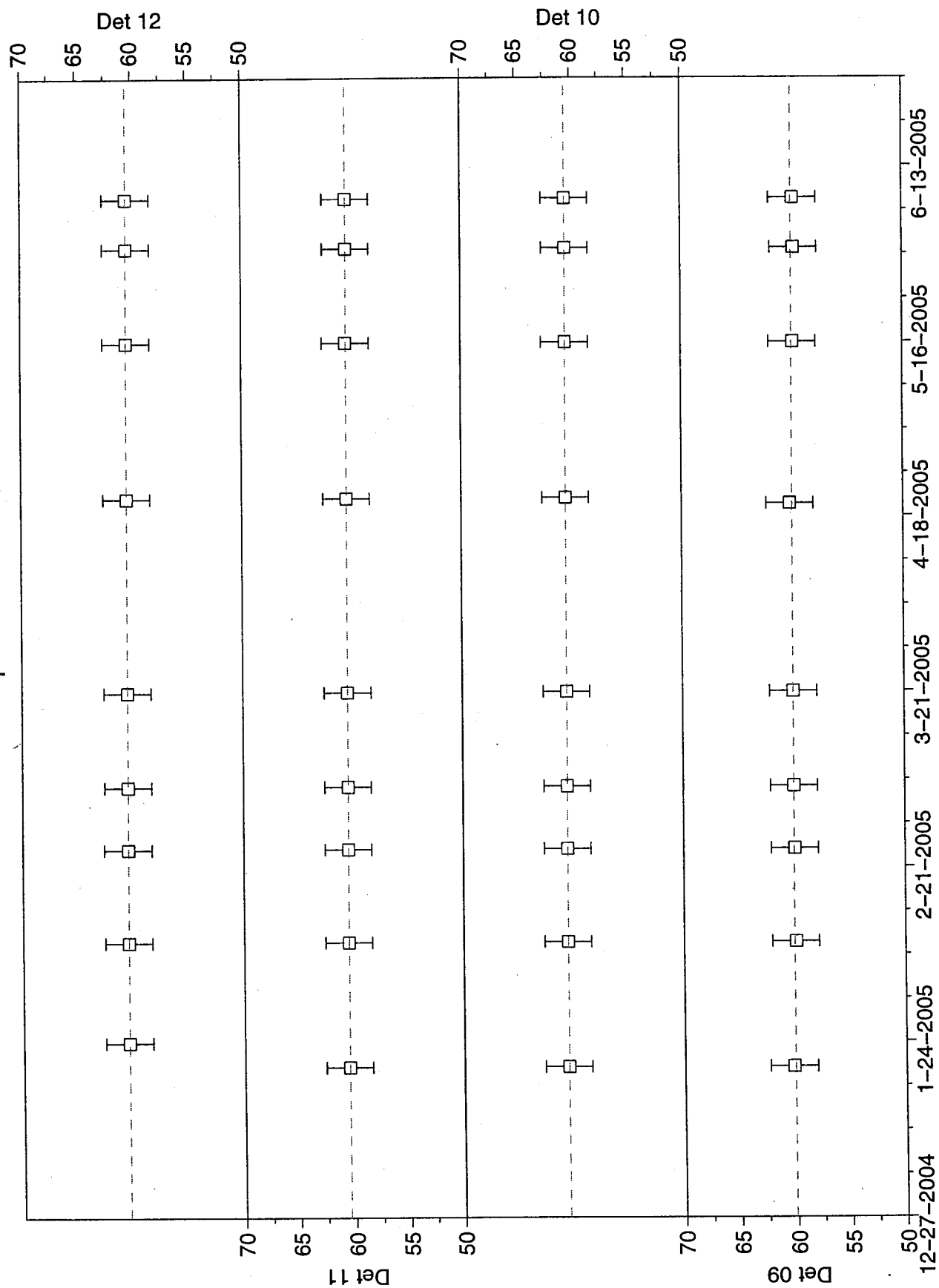
# naboo $\alpha$ QC Pulser Check

Pulses per Second



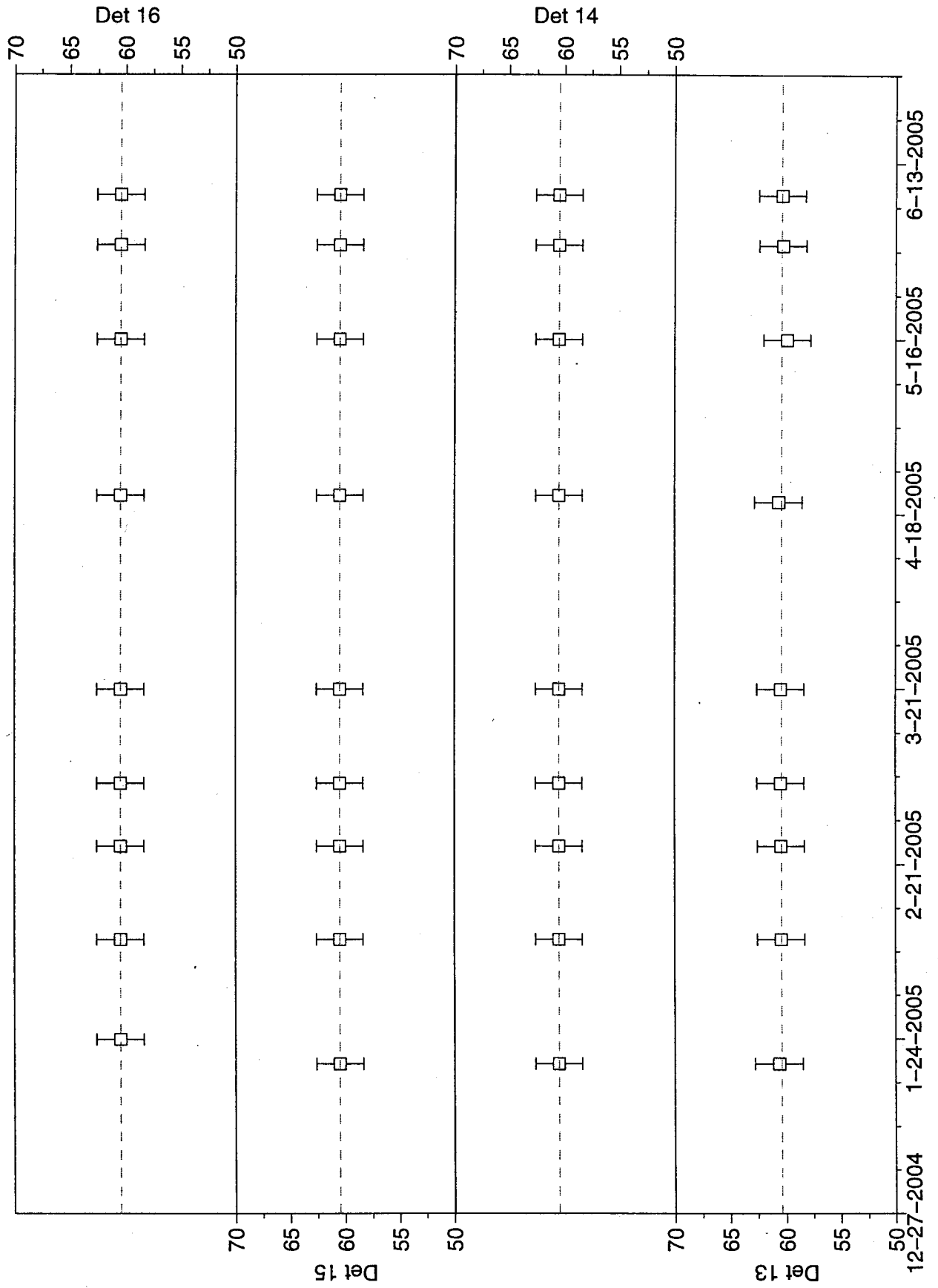
# naboo $\alpha$ QC Pulsar Check

Pulses per Second

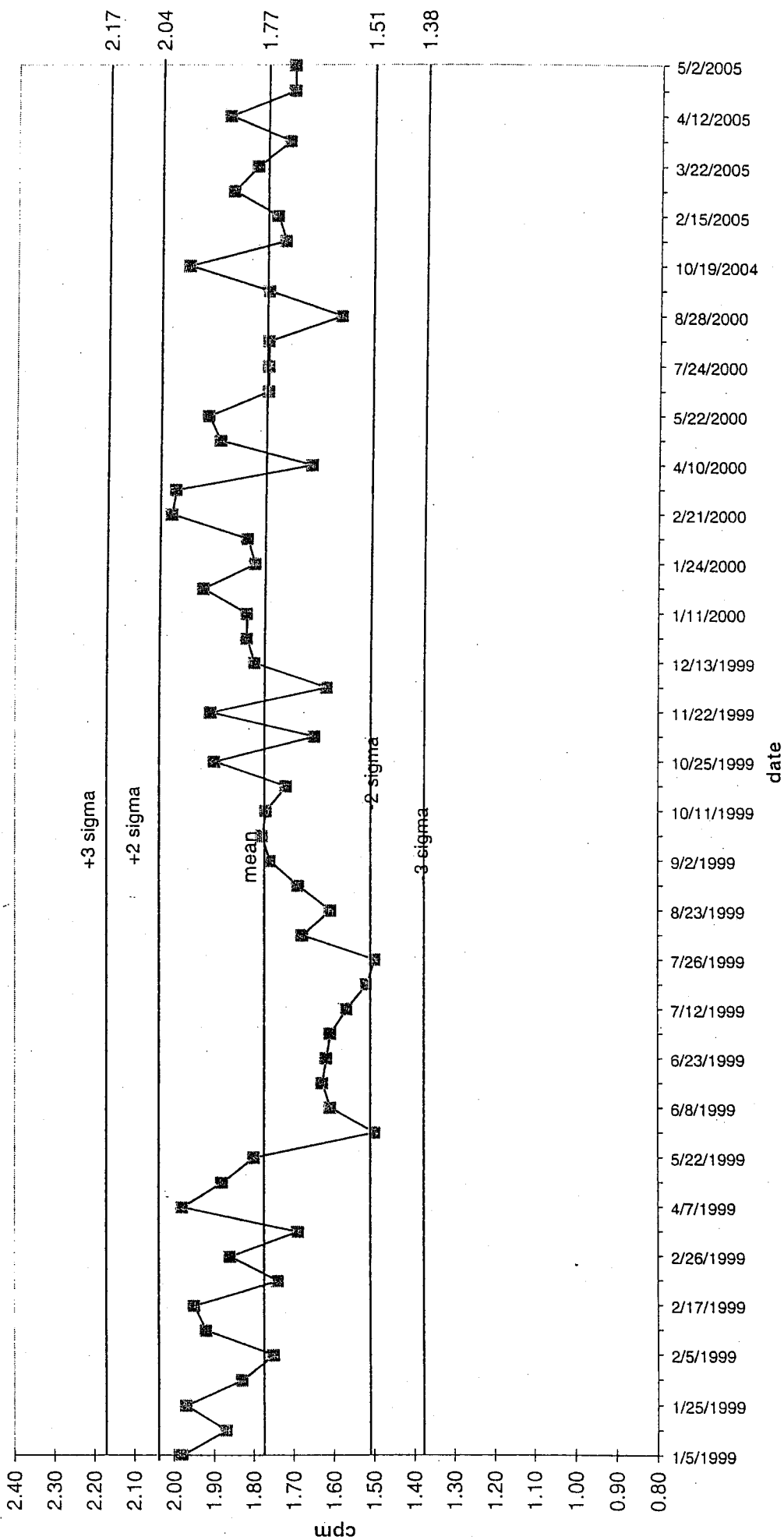


# naboo $\alpha$ QC Pulser Check

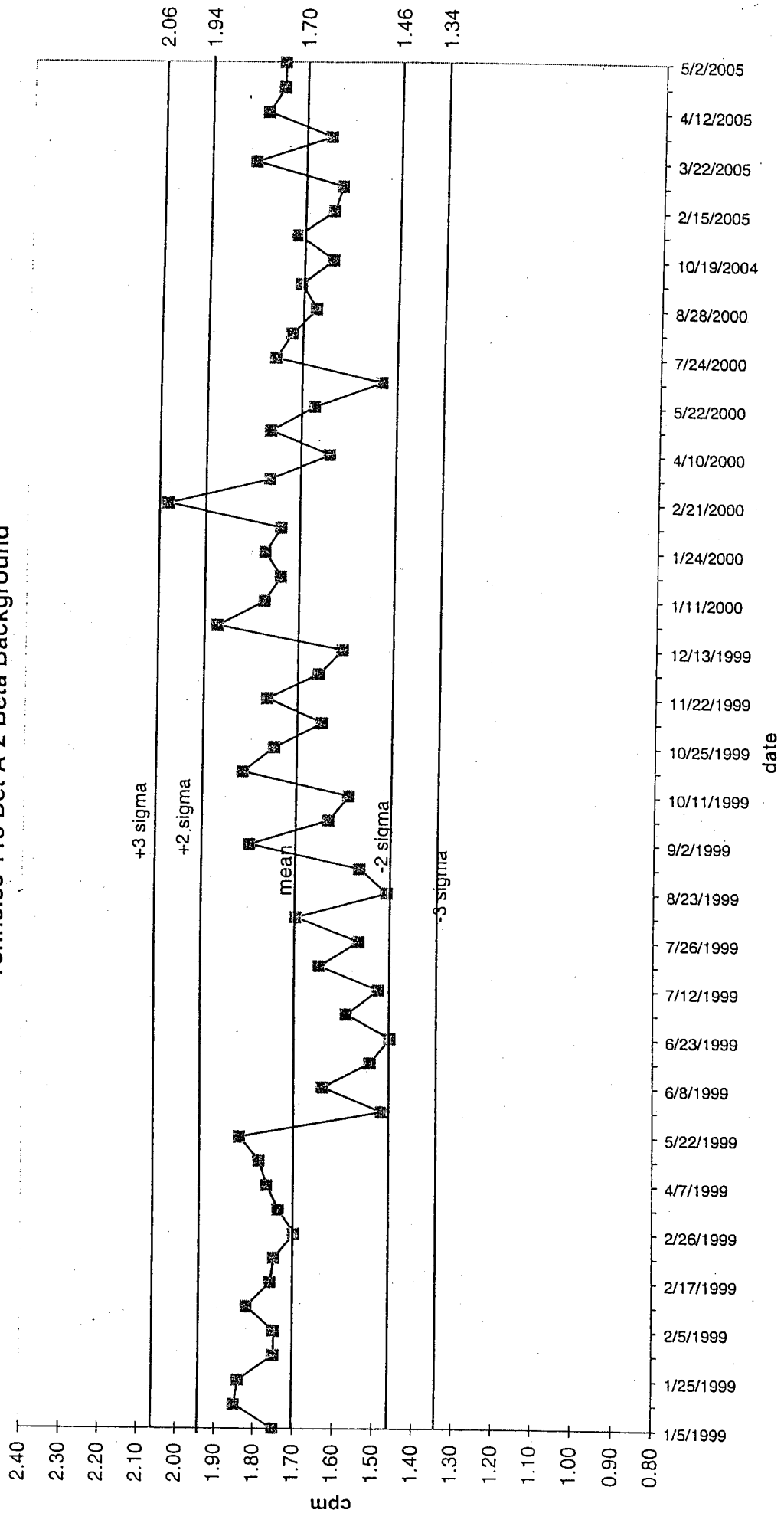
Pulses per Second



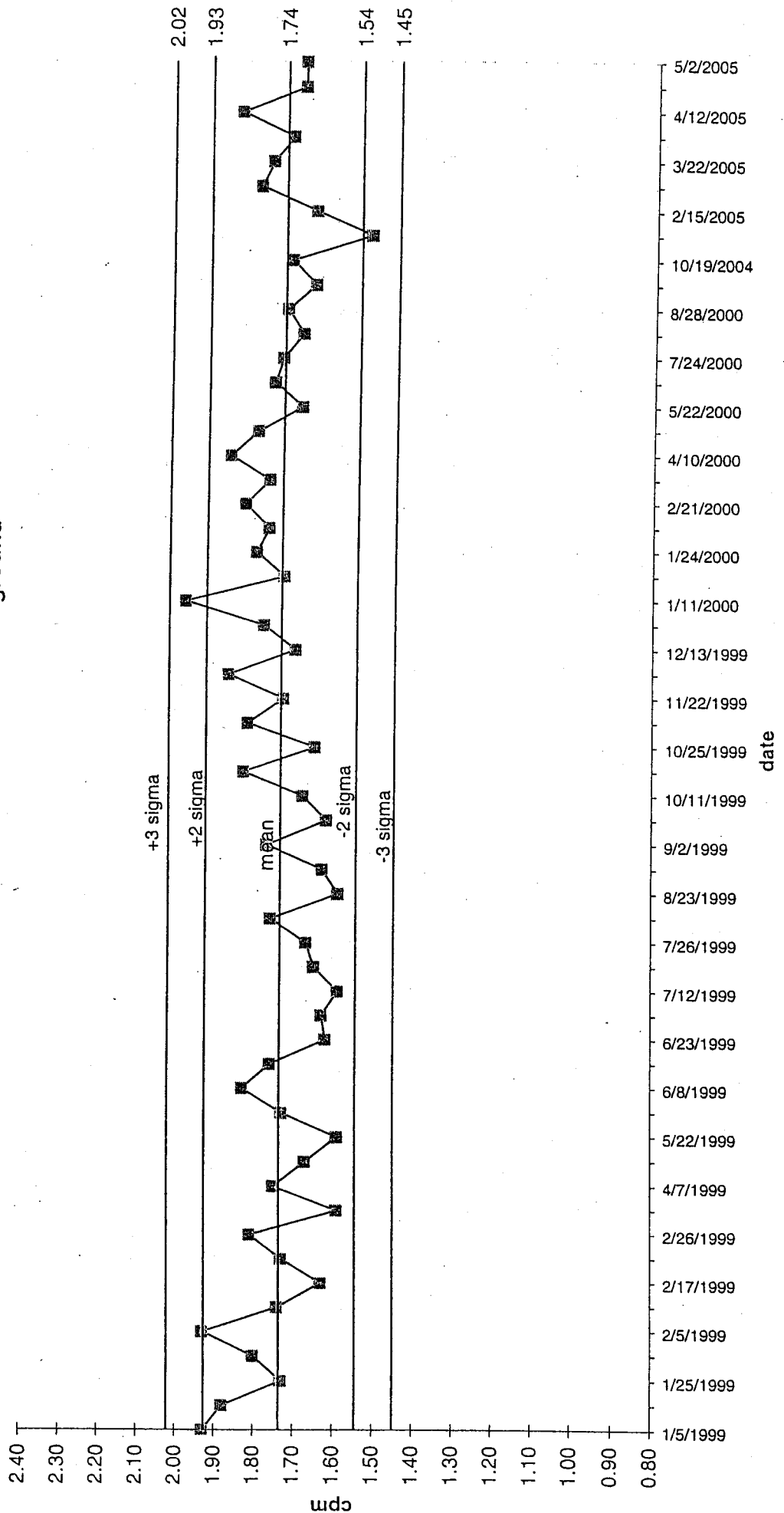
# Tennelec 118 Det A-1 Beta Background



# Tennelec 118 Det A-2 Beta Background

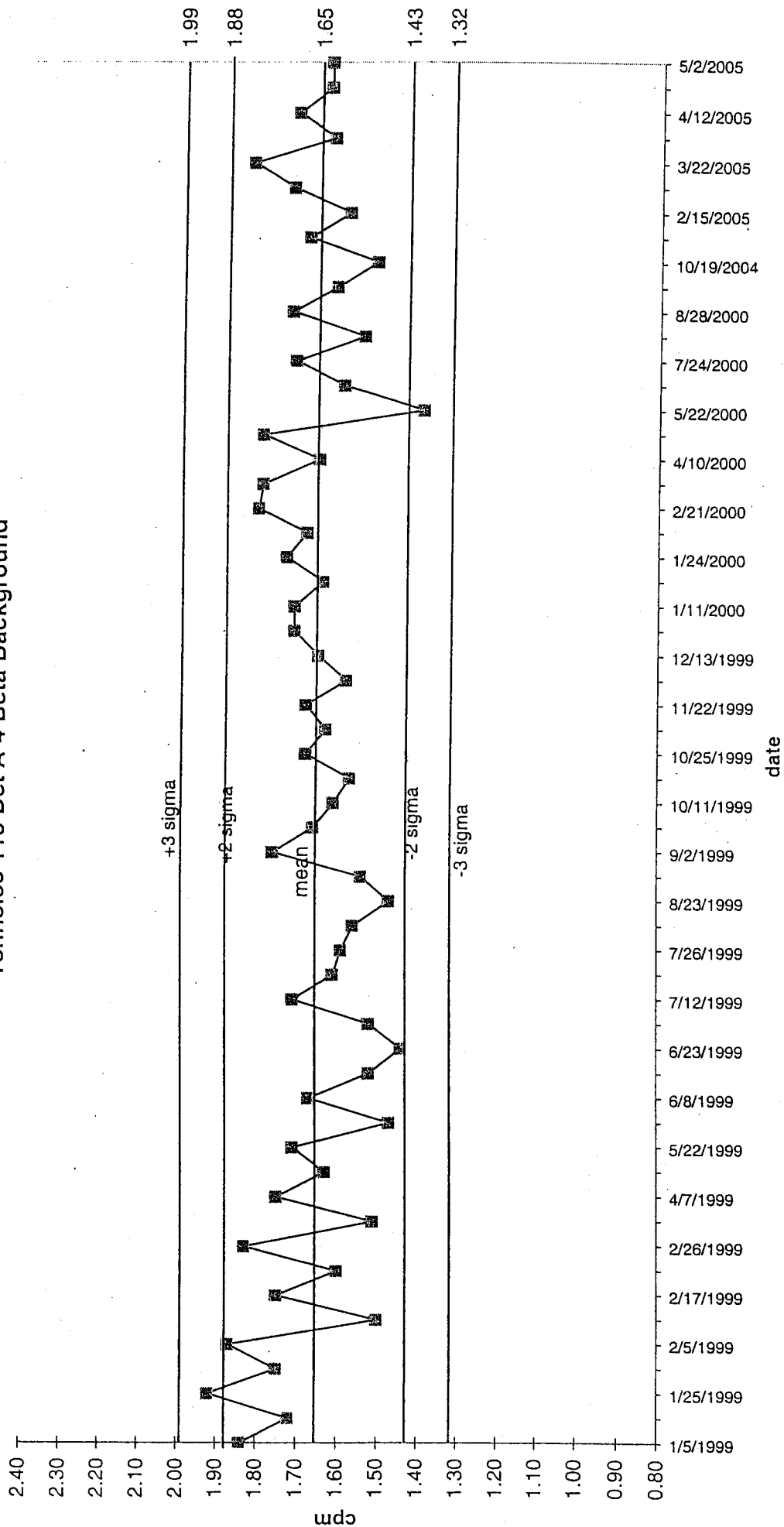


# Tennelec 118 Det A-3 Beta Background

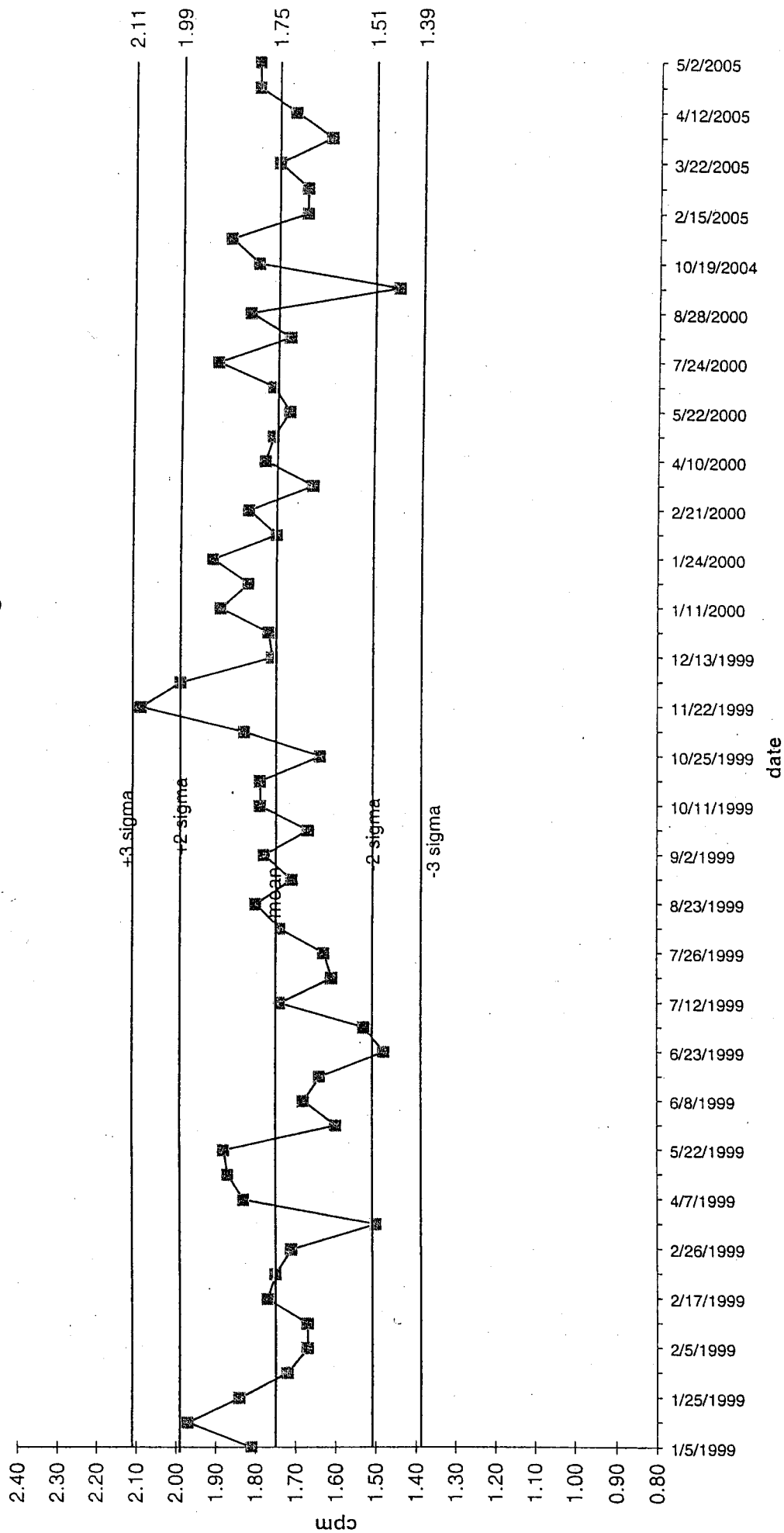




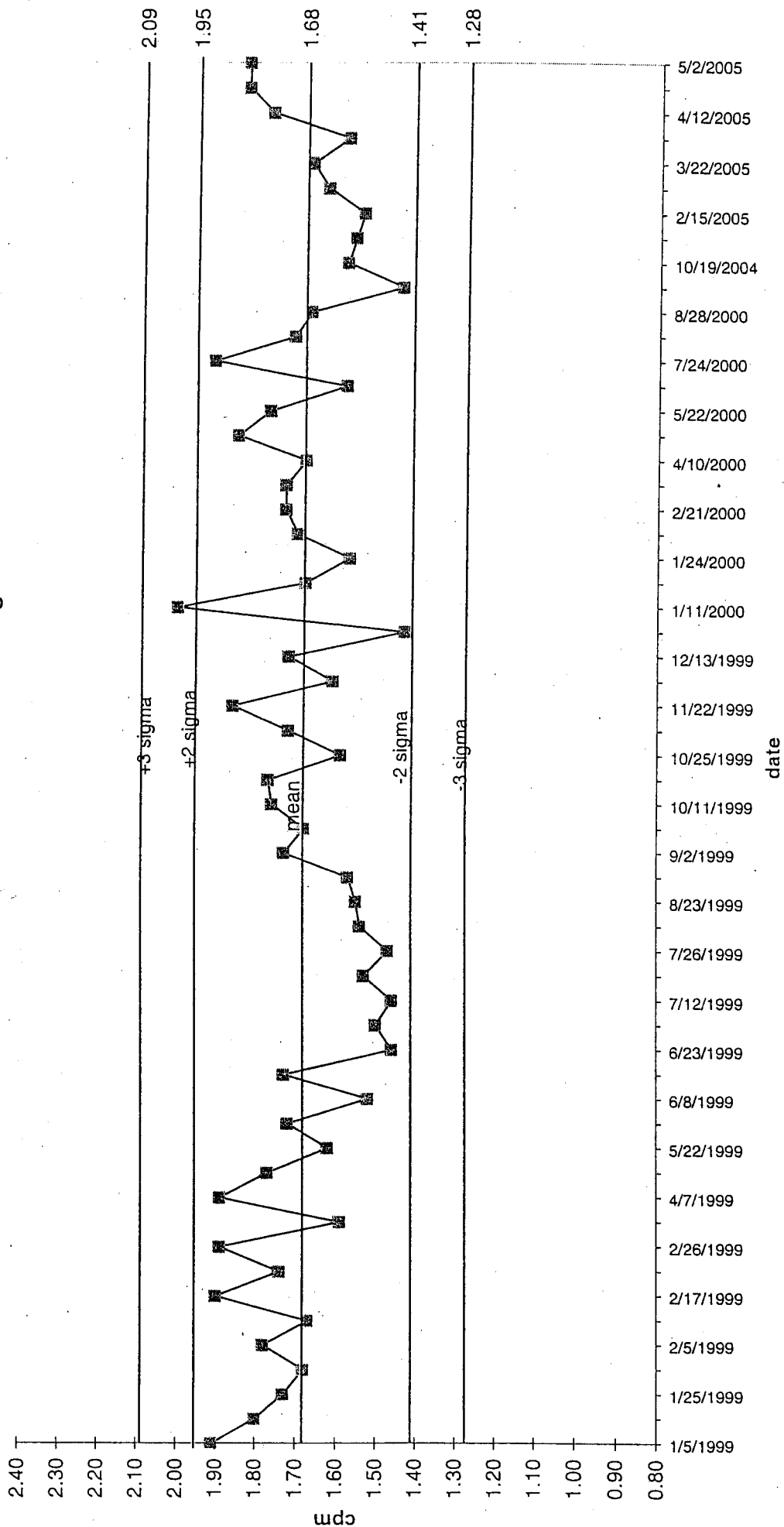
# Tennelec 118 Det A-4 Beta Background



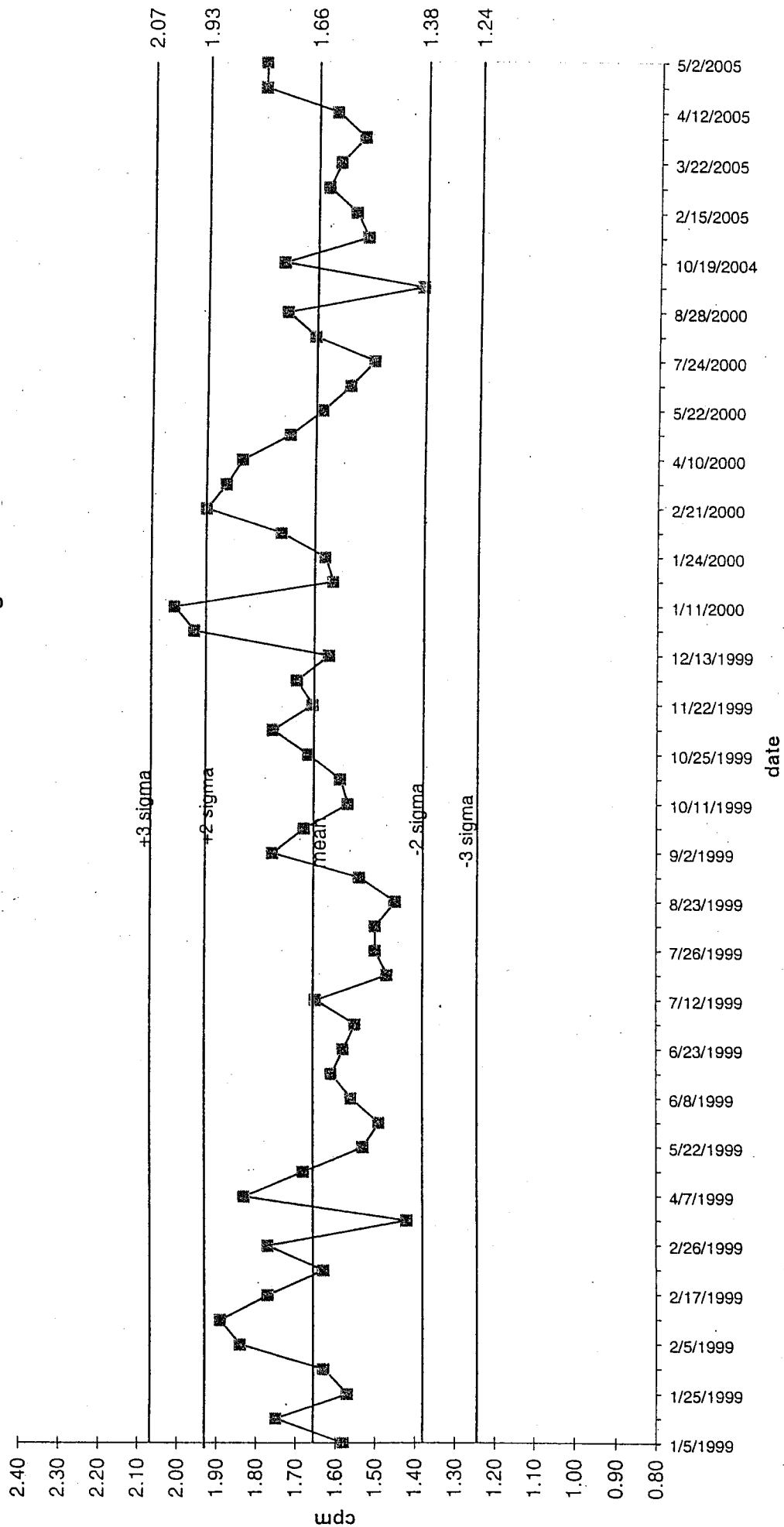
# Tennelec 118 Det B-1 Beta Background



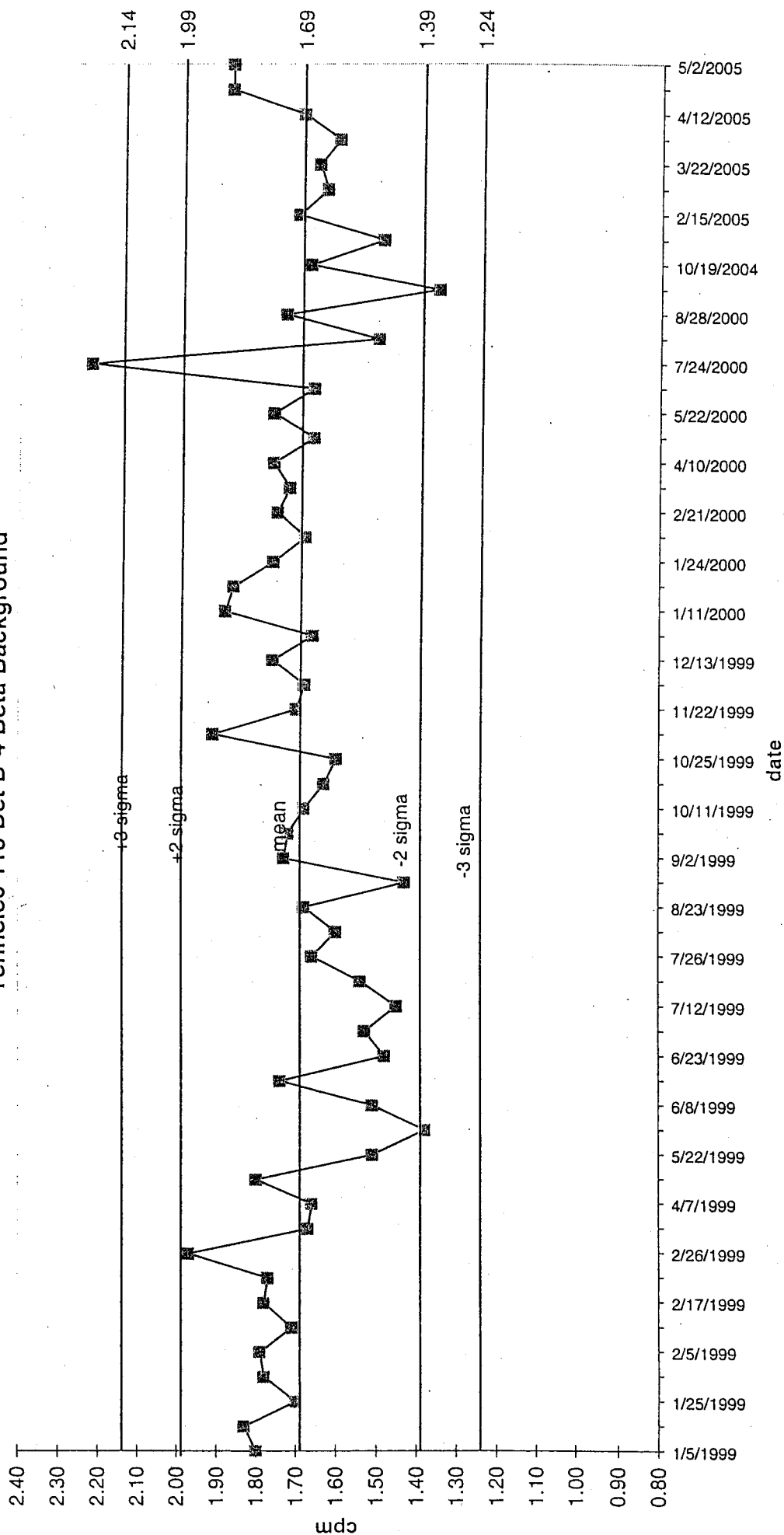
# Tennelec 118 Det B-2 Beta Background



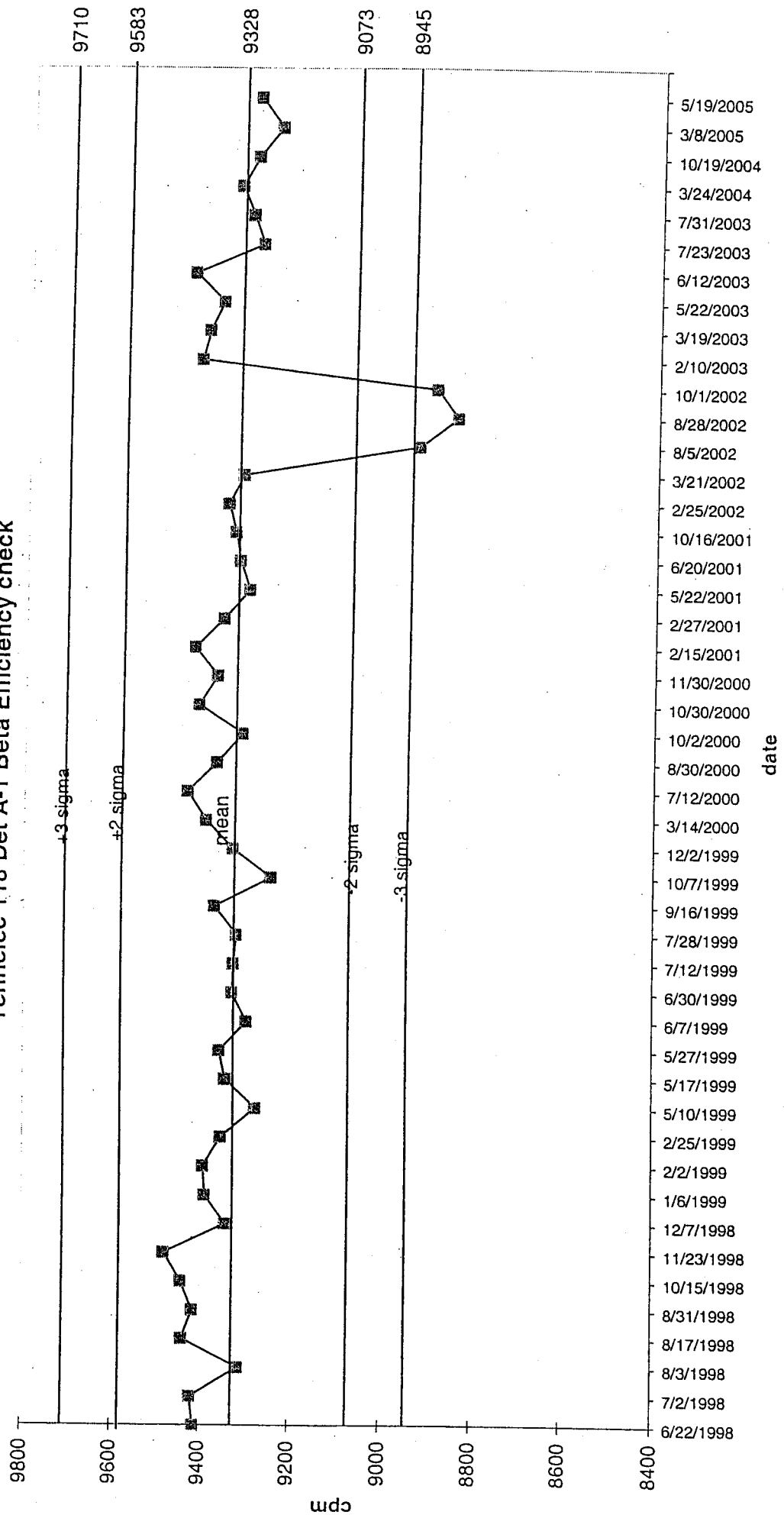
# Tennelec 118 Det B-3 Beta Background



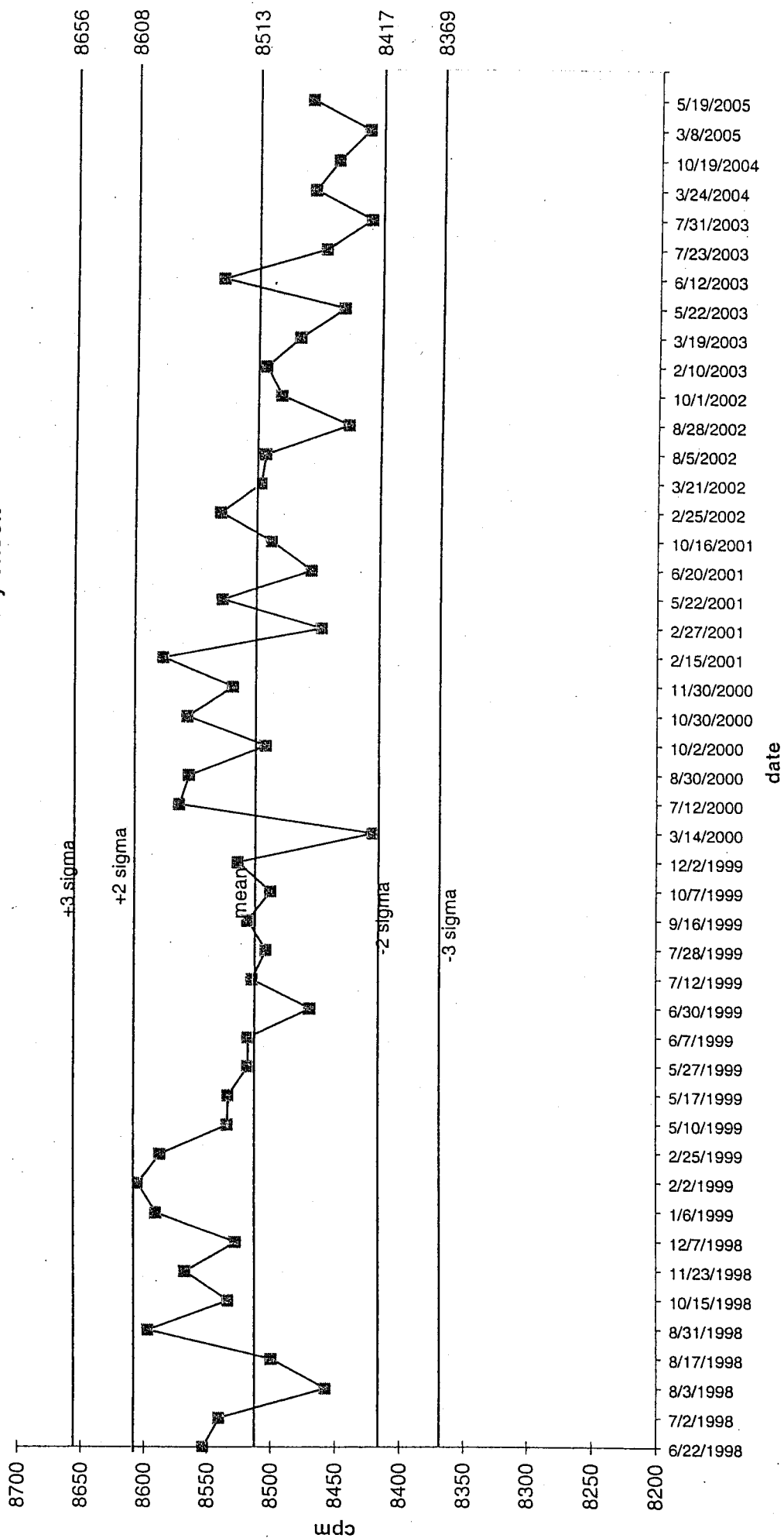
# Tennelec 118 Det B-4 Beta Background



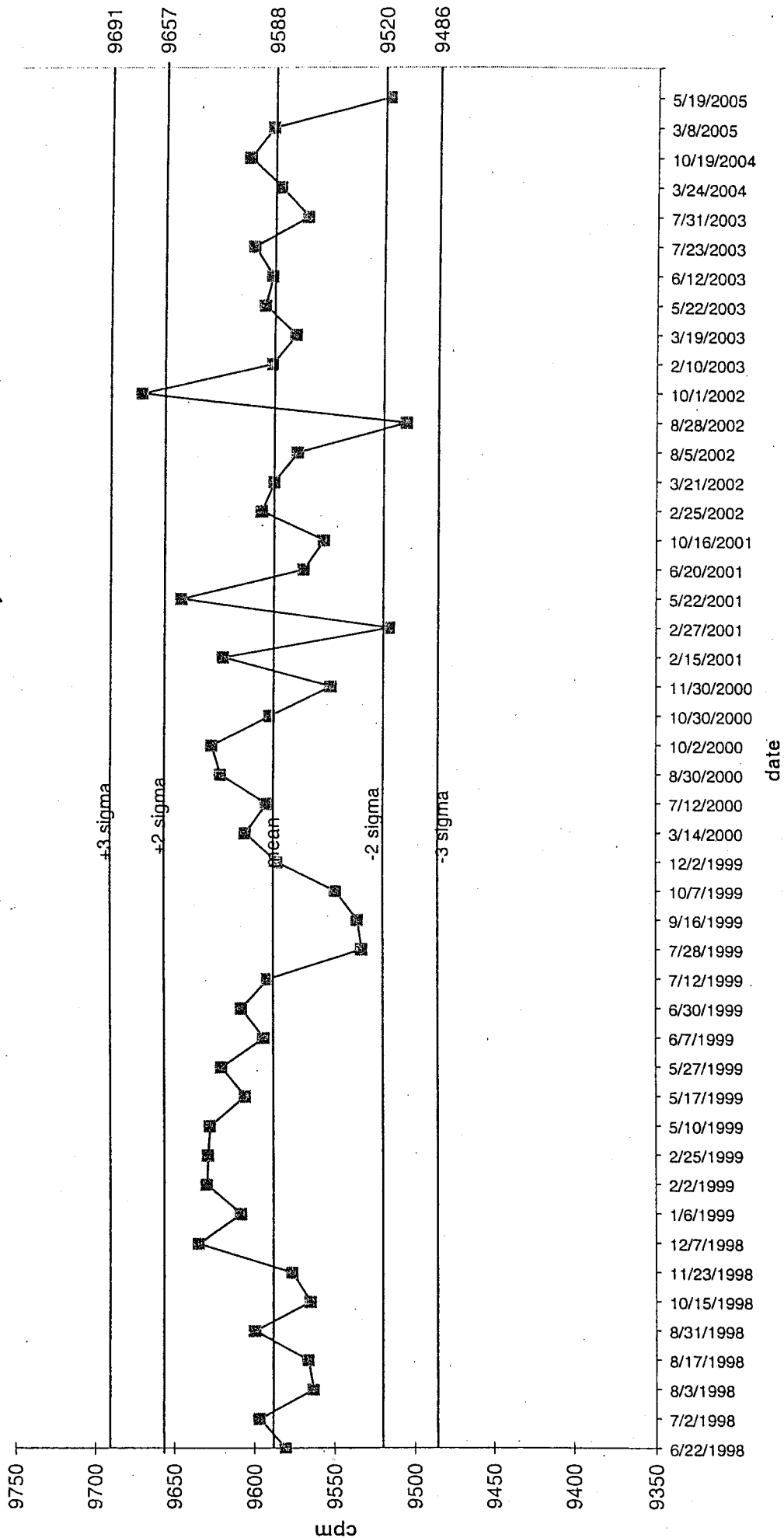
# Tennelec 118 Det A-1 Beta Efficiency check



# Tennelec 118 Det A-2 Beta Efficiency check

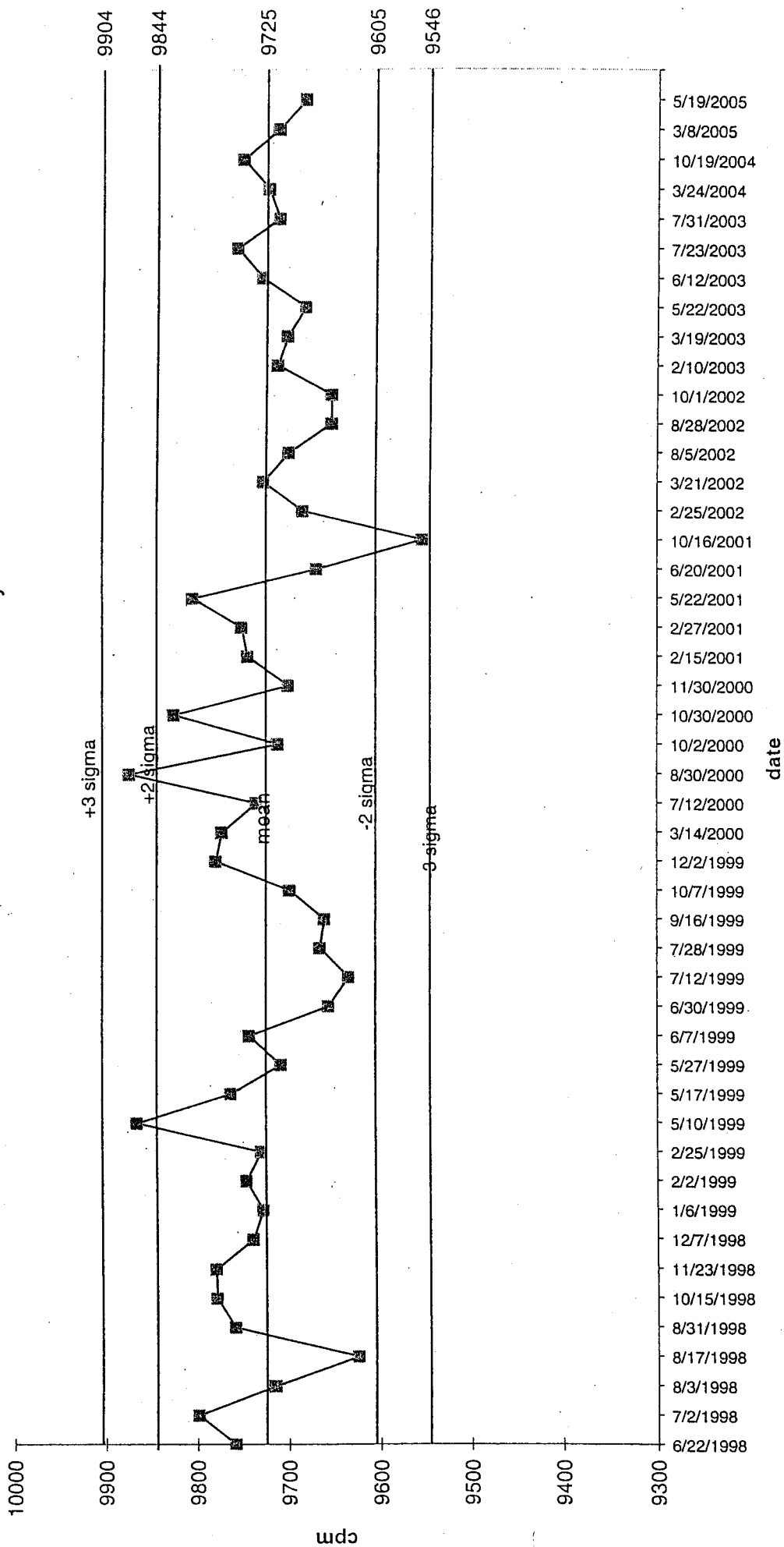


# Tennelec 118 Det A-3 Beta Efficiency check

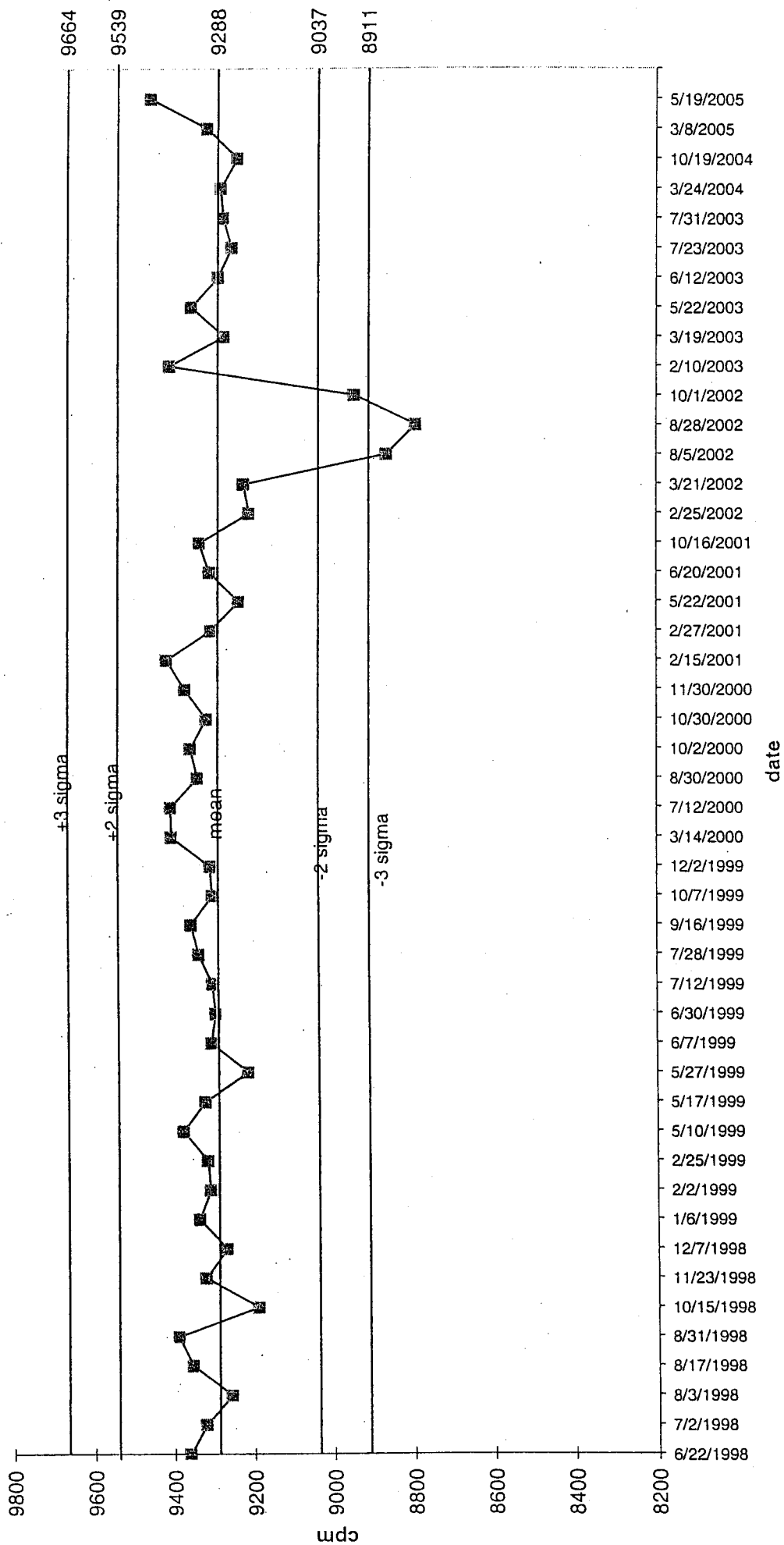




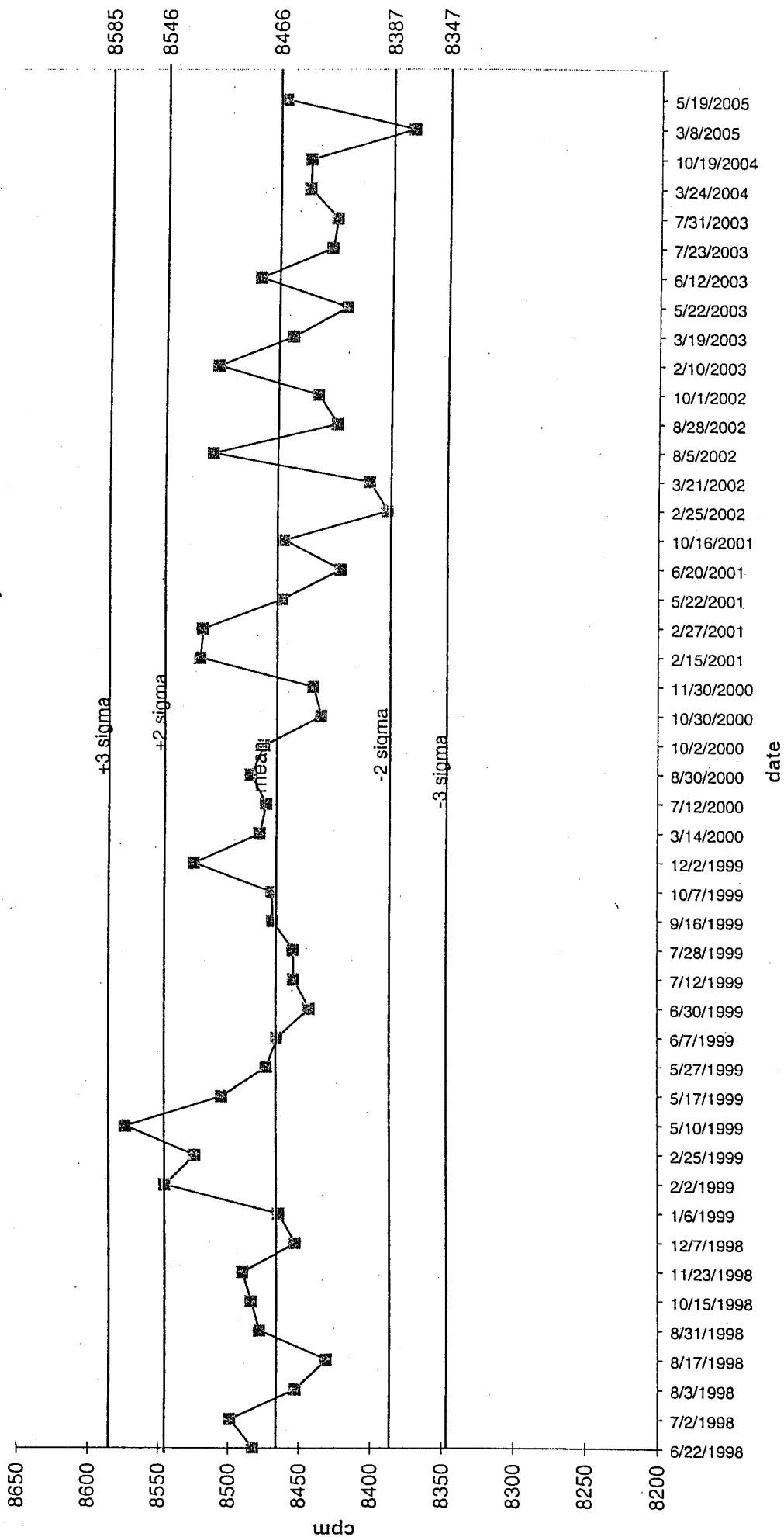
# Tennelec 118 Det A-4 Beta Efficiency check



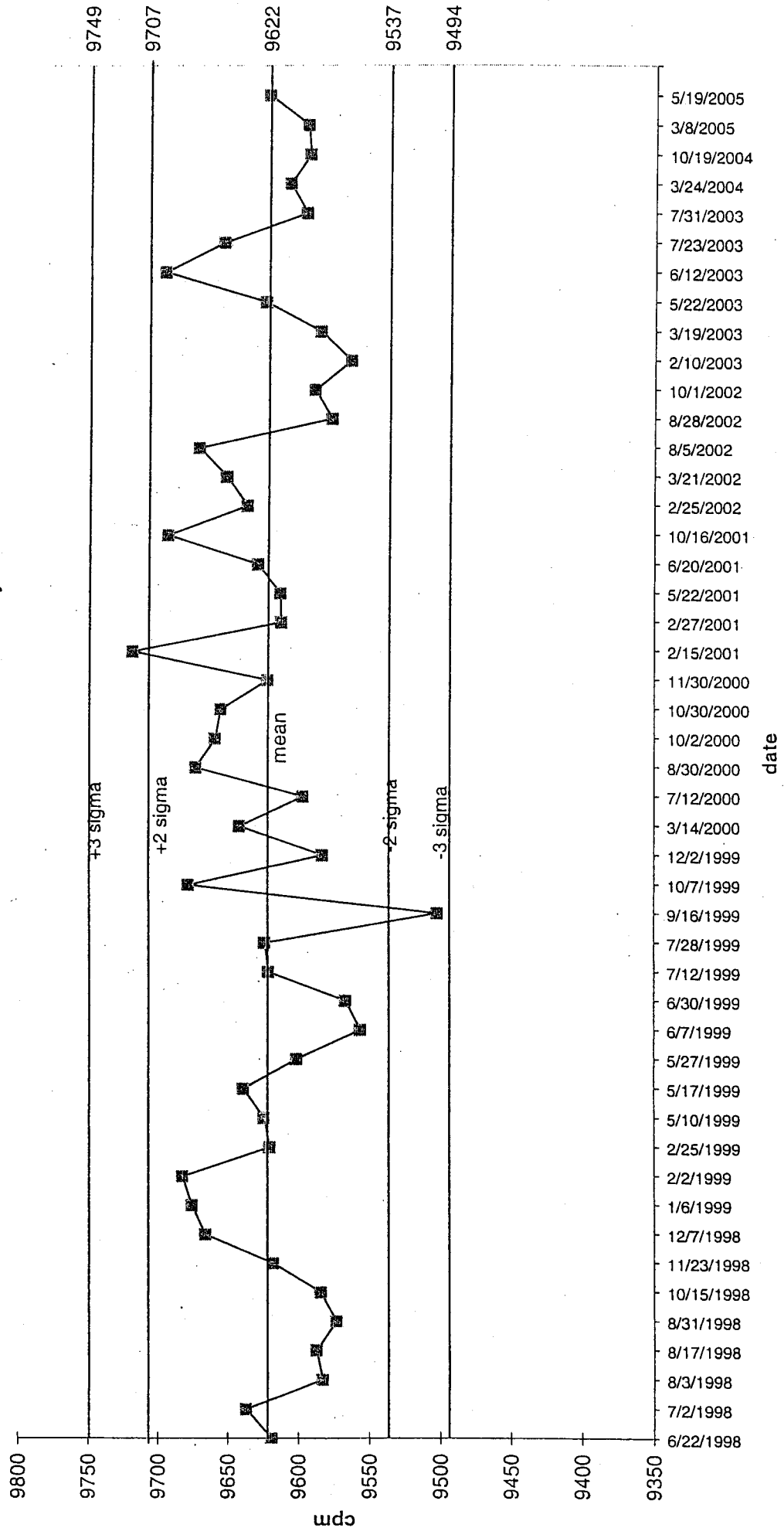
# Tennelec 118 Det B-1 Beta Efficiency check

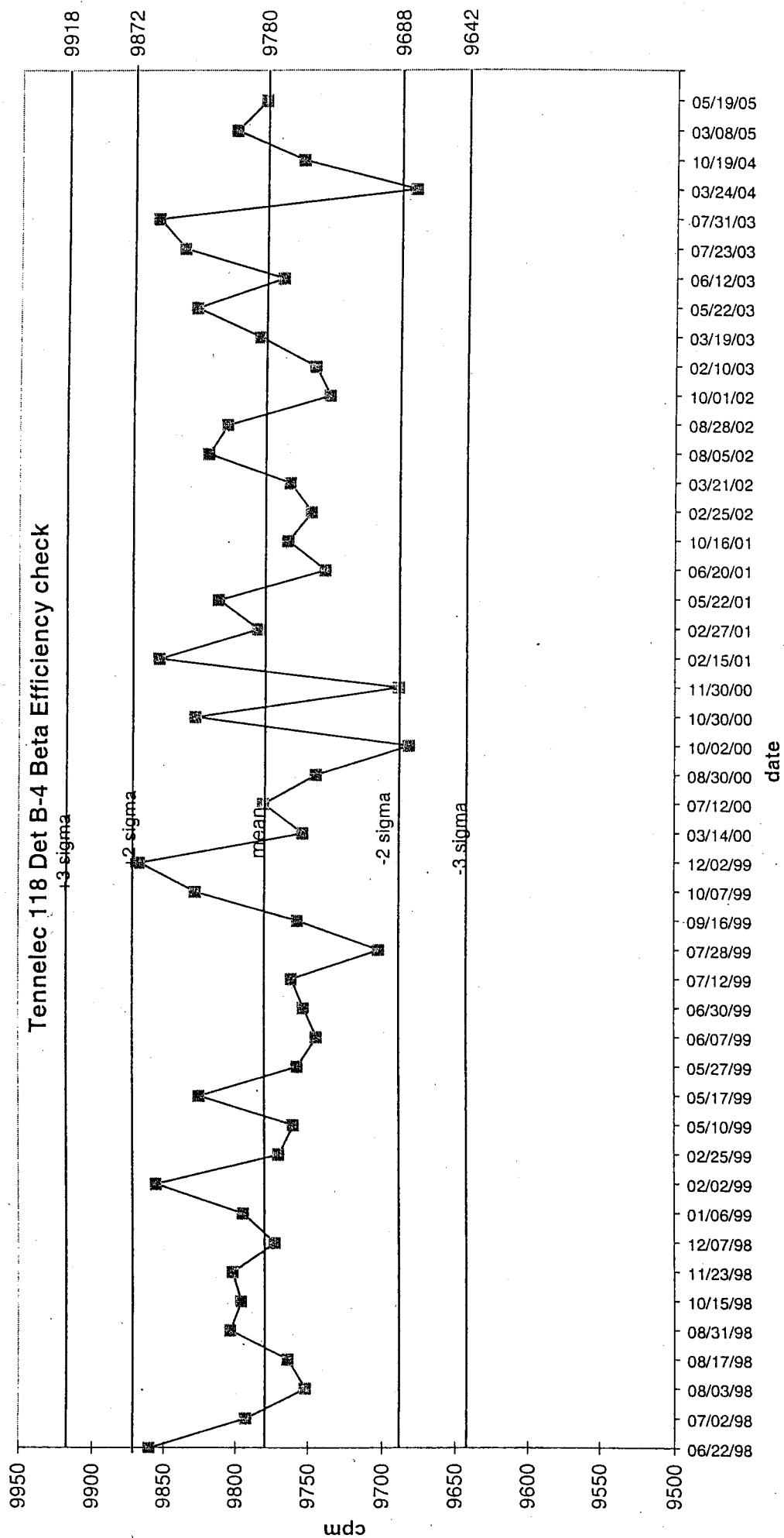


# Tennelec 118 Det B-2 Beta Efficiency check



# Tennelec 118 Det B-3 Beta Efficiency check







**Appendix D-1**

**Gamma Spectroscopy External QA/QC Program Results**

# RADIATION MEASUREMENTS LABORATORY (RML) QUALITY CONTROL DATA SHEET

GAMMA MEASUREMENTS - WATER - SESSION 13 JANUARY 1, 2005

DEPARTMENT OF ENERGY  
(DOE-MAPEP)

## MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM

DOE ID	RML SAMPLE ID	SAMPLE PREP. DATE	RADIO-NUCLIDE	DOE REFERENCE ACTIVITY (Bq/L)	GRAND MEAN (Bq/L)	RML ACTIVITY (Bq/L)	RML UNCERTAINTY (Bq/L)	RML/MEAN RATIO	RML/MAPEP RATIO	MAPEP % BIAS	RML QC LIMITS	MAPEP FLAG
MAPEP-05-Haw13 (.540 L)	A6030705006	01/01/05	Mn-54	331.00	329.51	323.00 ± 23.00	23.0	0.98	0.98	-2.40	IC	A
	A1030805004		Co-57	227.00	226.89	224.00 ± 16.00	16.0	0.99	0.99	-1.30	IC	A
	A4030905011		Co-60	251.00	249.57	250.00 ± 18.00	18.0	1.00	1.00	-0.40	IC	A
			Zn-65	496.00	521.66	509.00 ± 37.00	37.0	0.98	1.03	2.6	IC	A
			Cs-134	127.00	114.89	118.00 ± 9.00	9.0	1.03	0.93	-7.1	IC	A
			Cs-137	332.00	323.17	318.00 ± 23.00	23.0	0.98	0.96	-4.2	IC	A

COMMENTS: 1.) RML MEASURED VALUES ARE ALL WITHIN THE ACCEPTANCE CRITERIA ESTABLISHED BY DOE-MAPEP.

ACTION: 1.) NONE REQUIRED.

DOE REFERENCE ACTIVITY is the value assigned by the Radiological and Environmental Sciences Laboratory (RESL). Values are from DOE MAPEP report dated, May 11, 2005.

GRAND MEAN is the average value of all participating DOE contractor laboratories. Values shown are from the DOE-MAPEP report.

RML ACTIVITY and associated precision is determined from three individual measurements of the sample. It is shown exactly as reported by DOE-MAPEP.

RML UNCERTAINTY is the total uncertainty which includes the statistical/fitting, the estimated uncertainty in the sample geometry (5%), and detector efficiency (5%). These uncertainties have been propagated in quadrature and are expressed as one standard deviation.

RML/MEAN RATIO is the RML reported result to the average value (grand mean) of all participating laboratories. This ratio is used for comparative purposes only. RML/MAPEP RATIO is the RML reported result to the DOE reference value. The uncertainty (±) determined by MAPEP represents one standard deviation.

RML QC LIMITS: IC = "IN CONTROL" (In Control Criteria: < or = 2 standard deviations from the DOE reference value).  
LCL = "LOWER CONTROL LIMIT" [warning] (Lower Control Limit Criteria: >2 std.dev. and <3 std.dev. from the DOE reference value).  
UCL = "UPPER CONTROL LIMIT" [action] (Upper Control Limit Criteria: > or = 3 standard deviations from the DOE reference value).

MAPEP FLAGS: A = Acceptable (Bias <= 20%) W = Acceptable-warning (20% < Bias <= 30%) N = Not Acceptable (Bias > 30%)



# RADIATION MEASUREMENTS LABORATORY (RML) QUALITY CONTROL DATA SHEET

GAMMA MEASUREMENTS - SOIL - SESSION 12 MAY 1, 2004

DEPARTMENT OF ENERGY  
(DOE-MAPEP)

## MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM

DOE ID	RML SAMPLE ID	SAMPLE PREP. DATE	RADIO-NUCLIDE	DOE REFERENCE ACTIVITY (Bq/kg)	GRAND MEAN (Bq/kg)	RML ACTIVITY (Bq/kg)	RML UNCERTAINTY (Bq/kg)	RML/MEAN RATIO	RML/MAPEP RATIO	MAPEP % BIAS	RML QC LIMITS	MAPEP FLAG
BOTTLE 35	MAPEP-04-Mas12 D4082404020	05/01/04	K-40	604.00	620.87	531.00 ± 47.00	47.00	0.86	0.88	-12.10	IC	A
	A6082504020		Mn-54	485.00	495.30	510.00 ± 13.00	13.00	1.03	1.05	5.20	IC	A
	(298.71 grams) A2083004015		Co-57	400.00	389.69	412.00 ± 10.00	10.00	1.06	1.03	3.00	IC	A
			Co-60	518.00	527.93	542.00 ± 11.00	11.00	1.03	1.05	4.60	LCL	A
			Zn-65	699.00	740.39	746.00 ± 17.00	17.00	1.01	1.07	6.70	LCL	A
			Cs-134	414.00	375.02	416.00 ± 10.00	10.00	1.11	1.00	0.50	IC	A
			Cs-137	836.00	828.27	832.00 ± 15.00	15.00	1.00	1.00	-0.50	IC	A

COMMENTS: 1.) RML MEASURED VALUES ARE ALL WITHIN THE ACCEPTANCE CRITERIA ESTABLISHED BY DOE-MAPEP.

ACTION: 1.) NONE REQUIRED.

DOE REFERENCE ACTIVITY is the value assigned by the Radiological and Environmental Sciences Laboratory (RESL). Values are from RESL MAPEP report of Nov. 18, 2004.

GRAND MEAN is the average value of all participating DOE contractor laboratories. Values shown are from the DOE-MAPEP report.

RML ACTIVITY and associated precision is determined from three individual measurements of the sample. It is shown exactly as reported by DOE-MAPEP.

RML UNCERTAINTY is the total uncertainty which includes the statistical/fitting, the estimated uncertainty in the sample geometry (5%), and detector efficiency (5%). These uncertainties have been propagated in quadrature and are expressed as one standard deviation.

RML/MEAN RATIO is the RML reported result to the average value (grand mean) of all participating laboratories. This ratio is used for comparative purposes only. RML/MAPEP RATIO is the RML reported result to the DOE reference value. The uncertainty (±) determined by MAPEP represents one standard deviation.

RML QC LIMITS: IC = "IN CONTROL" (In Control Criteria: < or = 2 standard deviations from the DOE reference value).  
LCL = "LOWER CONTROL LIMIT" [warning] (Lower Control Limit Criteria: >2 std.dev. and <3 std.dev. from the DOE reference value).  
UCL = "UPPER CONTROL LIMIT" [action] (Upper Control Limit Criteria: > or = 3 standard deviations from the DOE reference value).

MAPEP FLAGS: A = Acceptable (Bias <= 20%) W = Acceptable-warning (20% < Bias <= 30%) N = Not Acceptable (Bias > 30%)

# RADIATION MEASUREMENTS LABORATORY (RML) QUALITY CONTROL DATA SHEET

GAMMA MEASUREMENTS - SOIL - SESSION 12 MAY 1, 2004

DEPARTMENT OF ENERGY  
(DOE-MAPEP)

## MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM

DOE ID	RML SAMPLE ID	SAMPLE PREP. DATE	RADIO-NUCLIDE	DOE REFERENCE ACTIVITY (Bq/kg)	GRAND MEAN (Bq/kg)	RML ACTIVITY (Bq/kg)	RML UNCERTAINTY (Bq/kg)	RML/MEAN RATIO	MAPEP RATIO	MAPEP % BIAS	RML QC LIMITS	MAPEP FLAG
MAPEP-04-MaS12 (298.71 grams) BOTTLE 35	D4082404020	05/01/04	K-40	604.00	620.87	531.00 ± 47.00	47.00	0.86	0.88	-12.10	IC	A
	A6082504020		Mn-54	485.00	495.30	510.00 ± 13.00	13.00	1.03	1.05	5.20	IC	A
	A2083004015		Co-57	400.00	389.69	412.00 ± 10.00	10.00	1.06	1.03	3.00	IC	A
			Co-60	518.00	527.93	542.00 ± 11.00	11.00	1.03	1.05	4.60	LCL	A
			Zn-65	699.00	740.39	746.00 ± 17.00	17.00	1.01	1.07	6.70	LCL	A
			Cs-134	414.00	375.02	416.00 ± 10.00	10.00	1.11	1.00	0.50	IC	A
			Cs-137	836.00	828.27	832.00 ± 15.00	15.00	1.00	1.00	-0.50	IC	A

COMMENTS: 1.) RML MEASURED VALUES ARE ALL WITHIN THE ACCEPTANCE CRITERIA ESTABLISHED BY DOE-MAPEP.

ACTION: 1.) NONE REQUIRED.

DOE REFERENCE ACTIVITY is the value assigned by the Radiological and Environmental Sciences Laboratory (RESL). Values are from RESL MAPEP report of Nov. 18, 2004.

GRAND MEAN is the average value of all participating DOE contractor laboratories. Values shown are from the DOE-MAPEP report.

RML ACTIVITY and associated precision is determined from three individual measurements of the sample. It is shown exactly as reported by DOE-MAPEP.

RML UNCERTAINTY is the total uncertainty which includes the statistical/fitting, the estimated uncertainty in the sample geometry (5%), and detector efficiency (5%). These uncertainties have been propagated in quadrature and are expressed as one standard deviation.

RML/MEAN RATIO is the RML reported result to the average value (grand mean) of all participating laboratories. This ratio is used for comparative purposes only.  
RML/MAPEP RATIO is the RML reported result to the DOE reference value. The uncertainty (±) determined by MAPEP represents one standard deviation.

RML QC LIMITS: IC = "IN CONTROL" (In Control Criteria: < or = 2 standard deviations from the DOE reference value).  
LCL = "LOWER CONTROL LIMIT" [warning] (Lower Control Limit Criteria: >2 std.dev. and <3 std.dev. from the DOE reference value).  
UCL = "UPPER CONTROL LIMIT" [action] (Upper Control Limit Criteria: > or = 3 standard deviations from the DOE reference value).

MAPEP FLAGS: A = Acceptable (Bias <= 20%) W = Acceptable-warning (20% < Bias <= 30%) N = Not Acceptable (Bias > 30%)



## **Appendix D-2**

### **Alpha Spectroscopy and Sr-90 External QA/QC Program Results**

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

LOCK03

RADIATION MEASUREMENTS LABORATORY/AEDL

Sample ID: MAPEP-05-MaW13

INEEL

Idaho Falls

ID

83415-7111

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc. Flag	Units
Barium	NR	2.63				1.84 - 3.42			
Beryllium	NR	0.417				0.29 - 0.54			
Cadmium	NR	0.303				0.21 - 0.39			
Chromium	NR	1.67				1.17 - 2.17			
Copper	NR	1.92				1.34 - 2.50			
Lead	NR	1.21				0.85 - 1.57			
Mercury	NR	0.102				0.07 - 0.13			
Nickel	NR	0.968				0.68 - 1.26			
Selenium	NR	0.362				0.25 - 0.47			
Uranium-238	NR	0.268							
Vanadium	NR	3.67				2.57 - 4.77			
Zinc	NR	1.33				0.93 - 1.73			
Americium-241	1.50	1.72	A		-12.8	1.20 - 2.24	.10		(Bq/L)
Cesium-134	118	127	A		-7.1	88.90 - 165.10	9		(Bq/L)
Cesium-137	318	332	A		-4.2	232.40 - 431.60	23		(Bq/L)
Cobalt-57	224	227	A		-1.3	158.90 - 295.10	16		(Bq/L)
Cobalt-60	250	251	A		-0.4	175.70 - 326.30	18		(Bq/L)
Hydrogen-3	320	280	A		14.3	196.00 - 364.00	50		(Bq/L)
Iron-55	81.3	75.9	A		7.1	53.13 - 98.67	4.9		(Bq/L)
Manganese-54	323	331	A		-2.4	231.70 - 430.30	23		(Bq/L)
Nickel-63	4.4	9.0	A	17			1.7		(Bq/L)
Plutonium-238	0.011	0.018	A	17			0.015		(Bq/L)
Plutonium-239/240	2.36	2.4	A		-1.7	1.68 - 3.12	.18		(Bq/L)
Strontium-90	-2		A				.4		(Bq/L)
Technetium-99	NR	42.9				30.03 - 55.77			
Uranium-234/233	3.23	3.24	A		-0.3	2.27 - 4.21	.23		(Bq/L)
Uranium-238	3.33	3.33	A		0.0	2.33 - 4.33	.23		(Bq/L)
Zinc-65	509	496	A		2.6	347.20 - 644.80	37		(Bq/L)

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

Sample ID: MAPEP-05-GrW13

LOCK03 RADIATION MEASUREMENTS LABORATORY/AEDL

INEEL

Idaho Falls

ID

83415-7111

Analyte	Result	Ref Value	Flag	Bias (%)	Acceptance Range	Unc Value	Unc. Flag	Units
Gross alpha	.038	0.525	A	-92.8	0.000 - 1.050	.006		(Bq/L)
Gross beta	1.53	1.67	A	-8.4	0.835 - 2.505	.06		(Bq/L)

### Gross Alpha Flags:

A = Result acceptable, Bias  $\leq \pm 100\%$  with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $> \pm 100\%$  or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

### Gross Beta Flags:

A = Result acceptable, Bias  $\leq \pm 50\%$  with a statistically positive result at two standard deviations (Result/Uncertainty  $> 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, does not include zero).

N = Result not acceptable, Bias  $> \pm 50\%$  or the reported result is not statistically positive at two standard deviations (Result/Uncertainty  $\leq 2$ , i.e., the range encompassing the result, plus or minus the total uncertainty at two standard deviations, includes zero).

### Flags:

L = Uncertainty potentially too low (for information purposes only)

H = Uncertainty potentially too high (for information purposes only)

FP = False Positive

FN = False Negative

NR = Not Reported

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

LOCK03

RADIATION MEASUREMENTS LABORATORY/AEDL

Sample ID: MAPEP-05-MaS13

INEEL

Idaho Falls

ID

83415-7111

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc. Flag	Units
Antimony	NR	30.9				21.63 - 40.17			
Arsenic	NR	51.9				36.33 - 67.47			
Barium	NR	792				554.40 - 1029.60			
Beryllium	NR	10.3				7.21 - 13.39			
Cadmium	NR	13.2				9.24 - 17.16			
Chromium	NR	57.2				40.04 - 74.36			
Lead	NR	69.0				48.30 - 89.70			
Mercury	NR	0.437				0.31 - 0.57			
Nickel	NR	144				100.80 - 187.20			
Silver	NR	43.1				30.17 - 56.03			
Thallium	NR	61.8				43.26 - 80.34			
Uranium-238	NR	20.0				14.00 - 26.00			
Vanadium	NR	92.7				64.89 - 120.51			
Zinc	NR	200				140.00 - 260.00			
Americium-241	NR	109				76.30 - 141.70			
Cesium-134	NR	759				531.30 - 986.70			
Cesium-137	NR	315				220.50 - 409.50			
Cobalt-57	NR	242				169.40 - 314.60			
Cobalt-60	NR	212				148.40 - 275.60			
Iron-55	NR	1200				840.00 - 1560.00			
Manganese-54	NR	485				339.50 - 630.50			
Nickel-63	NR	1220				854.00 - 1586.00			
Plutonium-239/240	NR	89.5				62.65 - 116.35			
Strontium-90	609	640	A		-4.8	448.00 - 832.00	28		(Bq/kg)
Technetium-99	NR	190				133.00 - 247.00			
Uranium-234/233	NR	62.5				43.75 - 81.25			
Uranium-238	NR	249				174.30 - 323.70			
Zinc-65	NR	810				567.00 - 1053.00			

### Flags:

A = Result acceptable  
W = Result acceptable with warning  
N = Result not acceptable  
L = Uncertainty potentially too low  
H = Uncertainty potentially too high  
Q = Participant should evaluate reported value  
QL = Quantitation Limit  
RW = Report Warning  
NR = Not Reported

Bias <= 20%  
20% < Bias <= 30%  
Bias > 30%

### Flag Text

- 1 - False Positive
- 2 - False Negative
- 4 - Sensitivity Evaluation
- 5 - Total Metal
- 6 - Not Evaluated
- 7 - DL > CLP Limit
- 9 - Check QL
- 10 - Check Isomer
- 11 - False Positive Test, Value Not Reported
- 14 - Solubility Issue
- 15 - Refractory
- 16 - Reported zero uncertainty
- 17 - NOT DETECTED, reported a statistical zero result
- 18 - Sensitivity evaluation, value not reported

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

LOCK03

RADIATION MEASUREMENTS LABORATORY/AEDL

Sample ID: MAPEP-03-W11

INEEL

Idaho Falls

ID

83415

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Antimony	NR	0.1296				0.09 - 0.17			
Arsenic	NR	0.0537				0.04 - 0.07			
Barium	NR	0.541				0.38 - 0.70			
Beryllium	NR	0.0985				0.07 - 0.13			
Cadmium	NR	0.0799				0.06 - 0.10			
Copper	NR	0.803				0.56 - 1.04			
Lead	NR	0.894				0.63 - 1.16			
Nickel	NR	0.495				0.35 - 0.84			
Selenium	NR	0.06981				0.05 - 0.09			
Thallium	NR	2.088				1.46 - 2.71			
Uranium-Total	NR	0.1968				0.14 - 0.26			
Uranium-235	NR	0.001417							
Uranium-238	NR	0.1954				0.14 - 0.25			
Vanadium	NR	1.2				0.84 - 1.56			
Zinc	NR	1.037				0.73 - 1.35			
Americium-241	NR								
Cesium-134	310	322	A		-3.7	225.40 - 418.60	20		(Bq/L)
Cesium-137	122	124	A		-1.6	86.80 - 161.20	9		(Bq/L)
Cobalt-57	170	173	A		-1.7	121.10 - 224.90	12		(Bq/L)
Cobalt-60	125	121.8	A		2.6	85.26 - 158.34	9		(Bq/L)
Hydrogen-3	NR	379				265.30 - 492.70			
Iron-55	123	131	A		-6.1	91.70 - 170.30	6		(Bq/L)
Manganese-54	154	155	A		-0.6	108.50 - 201.50	12		(Bq/L)
Nickel-63	81.3	73.7	A		10.3	51.59 - 95.81	4.7		(Bq/L)
Plutonium-238	1.28	1.49	A		-14.1	1.04 - 1.94	.11		(Bq/L)
Plutonium-239/240	2.26	2.39	A		-5.4	1.67 - 3.11	0.09		(Bq/L)
Strontium-90	15.4	17.7	A		-13.0	12.39 - 23.01	0.7		(Bq/L)
Technetium-99	NR	28.8				20.16 - 37.44			
Uranium-234/233	2.39	2.35	A		1.7	1.64 - 3.05	0.12		(Bq/L)
Uranium-238	2.35	2.43	A		-3.3	1.70 - 3.16	.12		(Bq/L)
Zinc-65	330	320	A		3.1	224.00 - 416.00	30		(Bq/L)

### Flags:

A = Result acceptable Bias <= 20%  
 W = Result acceptable with warning 20% < Bias <= 30%  
 N = Result not acceptable Bias > 30%  
 L = Uncertainty potentially too low (for information purposes only)  
 H = Uncertainty potentially too high (for information purposes only)  
 Q = Participant should evaluate reported value  
 QL = Quantitation Limit  
 RW = Report Warning  
 NR = Not Reported  
 NOTE 1: False Positive Test, Value Not Reported



# Mixed Analyte Performance Evaluation Program

## Laboratory Results

LOCK03

RADIATION MEASUREMENTS LABORATORY/AEDL  
INEEL

Sample ID: MAPEP-03-S10

Idaho Falls

ID

83415

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc Flag	Units
Antimony	NR	19.9				13.93 - 25.87			
Arsenic	NR	7.4				5.18 - 9.62			
Barium	NR	448				313.60 - 582.40			
Beryllium	NR	4.36				3.05 - 5.67			
Cadmium	NR	2.14				1.50 - 2.78			
Chromium	NR	27				18.90 - 35.10			
Lead	NR	14.4				10.08 - 18.72			
Nickel	NR	109				76.30 - 141.70			
Selenium	NR	1.69				1.18 - 2.20			
Silver	NR	11.7				8.19 - 15.21			
Vanadium	NR	92				64.40 - 119.60			
Zinc	NR	142				99.40 - 184.60			
Americium-241	0.3		A				0.5		(Bq/kg)
Cesium-134	252	238	A		5.9	166.60 - 309.40	20		(Bq/kg)
Cesium-137	920	832	A		10.6	582.40 - 1081.60	70		(Bq/kg)
Cobalt-57	630	530	A		18.9	371.00 - 689.00	50		(Bq/kg)
Cobalt-60	480	420	A		14.3	294.00 - 546.00	30		(Bq/kg)
Iron-55	NR	1020				714.00 - 1326.00			
Manganese-54	151	137	A		10.2	95.90 - 178.10	13		(Bq/kg)
Nickel-63	NR	770				539.00 - 1001.00			
Plutonium-238	62.3	66.9	A		-6.9	46.83 - 86.97	3.9		(Bq/kg)
Plutonium-239/240	50.3	52.7	A		-4.6	36.89 - 68.51	3.2		(Bq/kg)
Potassium-40	700	652	A		7.4	456.40 - 847.60	60		(Bq/kg)
Strontium-90	706	714	A		-1.1	499.80 - 928.20	27		(Bq/kg)
Uranium-234/233	87.8	89	A		-1.3	62.30 - 115.70	6.3		(Bq/kg)
Uranium-238	388	421	A		-7.8	294.70 - 547.30	26		(Bq/kg)
Zinc-65	560	490	A		14.3	343.00 - 637.00	40		(Bq/kg)

### Flags:

A = Result acceptable

Bias <= 20%

W = Result acceptable with warning 20% < Bias <= 30%

N = Result not acceptable

Bias > 30%

L = Uncertainty potentially too low (for information purposes only)

H = Uncertainty potentially too high (for information purposes only)

Q = Reported detection limit in question

QL = Quantitation Limit

RW = Report Warning

NR = Not Reported

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

Sample ID: MAPEP-02-W10

LOCK03

RADIATION MEASUREMENTS LABORATORY/AEDL

INEEL

Idaho Falls

ID

83415

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc. Flag	Units
Antimony	NR	0.241				0.17 - 0.31			
Arsenic	NR								
Barium	NR	0.756				0.53 - 0.98			
Beryllium	NR	0.802				0.56 - 1.04			
Chromium	NR	2.51				1.76 - 3.26			
Copper	NR	1.95				1.37 - 2.54			
Lead	NR	3.11				2.18 - 4.04			
Nickel	NR	2.16				1.51 - 2.81			
Selenium	NR	0.652				0.46 - 0.85			
Silver	NR								
Thallium	NR	1.4				0.98 - 1.82			
Uranium-Total	NR	0.13							
Uranium-235	NR	0.000919							
Uranium-238	NR	0.129							
Zinc	NR	2.46				1.72 - 3.20			
Americium-241	0.54	0.578	A		-6.6	0.40 - 0.75	0.04		(Bq/L)
Cesium-134	390	421	A		-7.4	294.70 - 547.30	30		(Bq/L)
Cesium-137	327	329	A		-0.6	230.30 - 427.70	30		(Bq/L)
Cobalt-57	58.3	57	A		2.3	39.90 - 74.10	4.0		(Bq/L)
Cobalt-60	39.3	38.2	A		2.9	26.74 - 49.66	3.0		(Bq/L)
Iron-55	97.3	96	A		1.4	67.20 - 124.80	6.1		(Bq/L)
Manganese-54	34	32.9	A		3.3	23.03 - 42.77	3		(Bq/L)
Nickel-63	152	136.5	A		11.4	95.55 - 177.45	12		(Bq/L)
Plutonium-238	0.85	0.828	A		2.7	0.58 - 1.08	0.05		(Bq/L)
Plutonium-239/240	-0.001		A				0.004		(Bq/L)
Strontium-90	12.4	12.31	A		0.7	8.62 - 16.00	0.7		(Bq/L)
Technetium-99	NR	132				92.40 - 171.60			
Uranium-234/233	1.51	1.54	A		-1.9	1.08 - 2.00	0.11		(Bq/L)
Uranium-235	0.073						0.017		(Bq/L)
Uranium-238	1.49	1.6	A		-6.9	1.12 - 2.08	0.083		(Bq/L)
Zinc-65	560	516	A		8.5	361.20 - 670.80	40		(Bq/L)

### Flags:

A = Result acceptable

Bias <= 20%

W = Result acceptable with warning 20% < Bias <= 30%

N = Result not acceptable

Bias > 30%

L = Uncertainty potentially too low (for information purposes only)

H = Uncertainty potentially too high (for information purposes only)

QL = Quantitation Limit

NR = Not Reported

NOTE 1: False Positive Test, Value Not Reported

# Mixed Analyte Performance Evaluation Program

## Laboratory Results

Sample ID: MAPEP-02-S9

LOCK03 RADIATION MEASUREMENTS LABORATORY/AEDL  
INEEL  
Idaho Falls ID 83415

Analyte	Result	Ref Value	Flag	Flag Text	Bias (%)	Acceptance Range	Unc Value	Unc. Flag	Units
Antimony	NR	18.5				12.95 - 24.05			
Arsenic	NR	70				49.00 - 91.00			
Barium	NR	300				210.00 - 390.00			
Beryllium	NR	0.95				0.67 - 1.24			
Cadmium	NR	17.3				12.11 - 22.49			
Chromium	NR	76				53.20 - 98.80			
Lead	NR	38.1				26.67 - 49.53			
Nickel	NR	24				16.80 - 31.20			
Selenium	NR	18.5				12.95 - 24.05			
Silver	NR	55.5				38.85 - 72.15			
Thallium	NR	46.3				32.41 - 60.19			
Uranium-Total	NR	18.5				12.95 - 24.05			
Uranium-235	NR	0.13				0.09 - 0.17			
Uranium-238	NR	18.4				12.88 - 23.92			
Vanadium	NR	53.9				37.73 - 70.07			
Zinc	NR	74.5				52.15 - 96.85			
Americium-241	44.1	43.5	A		1.4	30.45 - 56.55	2.7		(Bq/kg)
Cesium-134	859	862	A		-0.3	603.40 - 1120.60	61		(Bq/kg)
Cesium-137	113	111	A		1.8	77.70 - 144.30	8		(Bq/kg)
Cobalt-57	244	246	A		-0.8	172.20 - 319.80	17		(Bq/kg)
Cobalt-60	97	87.5	A		10.9	61.25 - 113.75	7		(Bq/kg)
Iron-55	NR	1870				1309.00 - 2431.00			
Manganese-54	592	546	A		8.4	382.20 - 709.80	42		(Bq/kg)
Nickel-63	NR	1180				826.00 - 1534.00			
Plutonium-238	32.8	33.3	A		-1.5	23.31 - 43.29	1.9		(Bq/kg)
Plutonium-239/240	69.6	72.9	A		-4.5	51.03 - 94.77	4.0		(Bq/kg)
Potassium-40	639	652	A		-2.0	456.40 - 847.60	50		(Bq/kg)
Strontium-90	-1.3		A				4.2		(Bq/kg)
Uranium-234/233	214	229	A		-6.6	160.30 - 297.70	11		(Bq/kg)
Uranium-235	14						1		(Bq/kg)
Uranium-238	222	220	A		0.9	154.00 - 286.00	11		(Bq/kg)
Zinc-65	900	809	A		11.2	566.30 - 1051.70	64		(Bq/kg)

Flags: A = Result acceptable Bias <= 20%  
W = Result acceptable with warning 20% < Bias <= 30%  
N = Result not acceptable Bias > 30%  
L = Uncertainty potentially too low (for information purposes only)  
H = Uncertainty potentially too high (for information purposes only)  
QL = Detection Limit  
RW = Report Warning  
NR = Not Reported

## QAP 58 Results by Laboratory

Lab: EG INEEL TRA Radioanalytical Laboratory, Scoville

No. Test	Radionuclide	Reported Value	Reported Error	EML Value	EML Error	Reported EML	Evaluation	QAP 56 Evaluation
Matrix: AI Air Filter Bq/ filter								
1	AM241	0.282	0.017	0.340	0.040	0.829	W	A
1	CO60	38.000	1.000	33.500	0.870	1.134	W	A
1	CS137	118.000	7.000	99.700	2.300	1.184	W	A
1	MN54	53.000	1.000	43.800	1.130	1.210	W	A
1	PU238	0.536	0.027	0.520	0.010	1.031	A	W
1	PU239	0.345	0.018	0.330	0.010	1.045	A	A
1	U234	0.221	0.014	0.240	0.003	0.921	A	A
1	U238	0.224	0.014	0.240	0.010	0.933	A	A
Matrix: SO Soil Bq/kg								
1	AC228	68.000	7.000	57.600	2.500	1.181	A	W
1	BI212	99.000	9.000	60.600	4.000	1.634	N	A
1	BI214	77.000	5.000	67.000	2.300	1.149	A	A
1	CS137	1672.000	11.000	1450.000	73.000	1.153	A	A
1	K40	688.000	48.000	636.000	33.000	1.082	A	A
1	PB212	81.000	5.000	57.900	2.900	1.399	N	A
1	PB214	83.000	5.000	71.100	2.300	1.167	A	A
1	TH234	224.000	21.000	127.000	7.100	1.764	W	A
Matrix: VE Vegetation Bq/kg								
1	CO60	10.500	3.000	12.100	0.700	0.868	W	W
1	CS137	435.000	8.000	444.000	22.000	0.980	A	A
1	K40	1160.000	80.000	1120.000	60.000	1.036	A	A
Matrix: WA Water Bq/L								
1	AM241	2.260	0.120	2.130	0.150	1.061	A	A
1	CO60	240.000	30.000	234.000	8.400	1.026	A	A
1	CS134	30.000	1.000	30.500	1.090	0.984	A	A
1	CS137	64.000	2.000	63.800	3.400	1.003	A	A
1	Gross Alpha	247.000	20.000	377.500	10.000	0.654	W	A
1	Gross Beta	784.000	55.000	627.500	10.000	1.249	A	A
1	PU238	3.870	0.200	3.330	0.300	1.162	W	W
1	PU239	4.570	0.230	3.920	0.300	1.166	W	W
1	U234	2.050	0.110	2.050	0.190	1.000	A	A
1	U238	2.040	0.150	2.160	0.210	0.944	A	A

Values for elemental uranium are reported in µg/filter, g, or mL.

pCi/g or mL=Bq x 0.027

Evaluation: A=Acceptable, W=Acceptable with Warning, N=Not Acceptable

If the evaluation system is not appropriate for the types of analyses performed in your lab, apply a site specific evaluation.

## QAP 57 Results by Laboratory

Lab: EG INEEL TRA Radioanalytical Laboratory, Scoville

No. Test	Radionuclide	Reported Value	Reported Error	EML Value	EML Error	Reported EML	Evaluation	QAP 56 Evaluation
Matrix: AI Air Filter Bq / filter								
1	AM241	0.195	0.014	0.191	0.004	1.023	A	A
1	CO60	25.000	2.000	23.000	0.059	1.087	A	A
1	CS137	36.000	3.000	32.500	0.777	1.108	A	A
1	MN54	60.000	5.000	52.200	1.170	1.149	A	A
1	PU238	0.097	0.005	0.119	0.003	0.817	W	A
1	PU239	0.183	0.009	0.206	0.002	0.889	A	A
1	SR90	5.740	0.290	5.561	0.119	1.032	A	A
1	U234	0.218	0.009	0.228	0.006	0.958	A	A
1	U238	0.215	0.009	0.230	0.006	0.935	A	A

Matrix: SO Soil Bq / kg

1	AC228	36.000	7.000	42.300	1.560	0.851	W	A
1	AM241	6.870	0.690	6.767	0.301	1.015	A	A
1	BI212	47.000	20.000	45.930	4.510	1.023	A	A
1	BI214	31.000	4.000	33.630	1.560	0.922	A	N
1	CS137	755.000	60.000	829.330	41.580	0.910	A	A
1	K40	600.000	41.000	637.670	34.260	0.941	A	N
1	PB212	42.000	4.000	43.430	2.710	0.967	A	W
1	PB214	34.000	4.000	35.200	1.510	0.966	A	A
1	PU238	18.400	1.400	19.203	0.855	0.958	A	A
1	PU239	13.400	0.700	12.903	0.465	1.038	A	W
1	TH234	51.000	22.000	48.400	4.830	1.054	A	A
1	U234	47.900	2.900	42.320	3.100	1.132	W	A
1	U238	48.100	2.400	44.890	3.200	1.072	A	A

Matrix: VE Vegetation Bq / kg

1	CO60	12.000	3.000	9.660	0.630	1.242	W	W
1	CS137	295.000	23.000	300.670	15.250	0.981	A	A
1	K40	1346.000	140.000	1480.000	77.800	0.909	A	W

Matrix: WA Water Bq / L

1	AM241	3.090	0.220	3.043	0.082	1.015	A	A
1	CO60	263.000	20.000	268.670	9.710	0.979	A	A
1	CS134	57.000	4.000	60.200	1.860	0.947	A	W
1	CS137	77.000	6.000	81.430	4.280	0.946	A	A
1	Gross Alpha	221.000	28.000	210.000	21.000	1.052	A	A
1	Gross Beta	909.000	91.000	900.000	90.000	1.010	A	A
1	PU238	3.710	0.170	4.331	0.117	0.857	W	A
1	PU239	1.840	0.080	2.070	0.074	0.889	W	A
1	SR90	7.900	0.600	8.690	0.420	0.909	A	A
1	U234	3.050	0.150	3.323	0.114	0.918	A	A
1	U238	3.120	0.140	3.370	0.140	0.926	A	A

Values for elemental uranium are reported in µg/filter, g, or mL.

pCi/g or mL=Bq x 0.027

Evaluation: A=Acceptable, W=Acceptable with Warning, N=Not Acceptable

If the evaluation system is not appropriate for the types of analyses performed in your lab, apply a site specific evaluation.

## QAP 56 Results by Laboratory

Lab: EG INEEL TRA Radioanalytical Laboratory, Scoville

No. Test	Radionuclide	Reported Value	Reported Error	EML Value	EML Error	Reported EML	Evaluation	QAP 55 Evaluation
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Matrix: AI Air Filter Bq / filter

1	AM241	0.092	0.007	0.088	0.005	1.042	A	
1	CO60	33.300	2.000	30.520	0.652	1.091	A	A
1	CS137	31.000	2.000	28.230	0.701	1.098	A	A
1	MN54	43.700	3.000	38.530	0.867	1.134	A	A
1	PU238	0.063	0.005	0.057	0.001	1.097	A	
1	PU239	0.208	0.013	0.187	0.003	1.110	A	
1	SR90	4.080	0.130	4.832	0.184	0.844	A	
1	U234	0.289	0.020	0.297	0.004	0.972	A	
1	U238	0.294	0.020	0.298	0.004	0.986	A	

Matrix: SO Soil Bq/kg

1	AC228	58.000	10.000	51.167	1.941	1.134	A	W
1	AM241	11.400	0.900	10.927	0.373	1.043	A	
1	BI212	61.000	24.000	53.430	5.215	1.142	A	A
1	BI214	39.000	7.000	53.933	2.249	0.723	N	A
1	CS137	1370.000	100.000	1326.670	66.510	1.033	A	A
1	K40	490.000	80.000	621.670	33.860	0.788	N	A
1	PB212	62.000	6.000	51.100	2.753	1.213	W	A
1	PB214	65.000	8.000	54.367	2.249	1.196	A	W
1	PU239	22.400	1.900	19.098	0.706	1.173	W	
1	SR90	51.800	2.800	53.756	1.446	0.964	A	
1	TH234	124.000	26.000	89.300	6.837	1.389	A	A
1	U234	84.200	5.300	93.885	7.767	0.897	A	
1	U238	86.900	5.600	96.778	8.410	0.898	A	

Matrix: VE Vegetation Bq/kg

1	AM241	2.400	0.180	2.228	0.216	1.077	A	
1	CM244	1.300	0.110	1.320	0.164	0.985	A	
1	CO60	9.100	1.900	11.230	0.677	0.810	W	W
1	CS137	317.000	25.000	313.667	15.910	1.011	A	A
1	K40	740.000	100.000	864.330	47.220	0.856	W	A
1	PU238	0.250	0.040	0.257	0.046	0.974	A	
1	PU239	3.540	0.250	3.543	0.377	0.999	A	
1	SR90	520.000	17.000	586.280	11.140	0.887	A	

Matrix: WA Water Bq/L

1	AM241	1.570	0.100	1.474	0.021	1.065	A	A
1	CO60	360.000	30.000	347.330	12.400	1.036	A	A
1	CS134	3.000	0.400	3.357	0.200	0.894	W	
1	CS137	57.000	4.000	56.067	2.929	1.017	A	A
1	GROSS ALPHA	360.000	29.000	375.000	37.500	0.960	A	A
1	GROSS BETA	1080.000	58.000	1030.000	103.000	1.049	A	A
1	PU238	0.480	0.037	0.490	0.032	0.979	A	A

Values for elemental uranium are reported in µg/filter, g, or mL.

pCi/g or mL=Bq x 0.027

Evaluation: A=Acceptable, W=Acceptable with Warning, N=Not Acceptable

If the evaluation system is not appropriate for the types of analyses performed in your lab, apply a site specific evaluation.

QAP 0203

EML-617  
June 2002**QAP 56 Results by Laboratory****Lab:** EG INEEL TRA Radioanalytical Laboratory, Scoville

No. Test	Radionuclide	Reported Value	Reported Error	EML Value	EML Error	Reported EML	Evaluation	QAP 55 Evaluation
Matrix: WA Water Bq/L								
1	PU239	4.490	0.270	4.219	0.172	1.064	A	A
1	SR90	6.520	0.280	7.579	0.176	0.860	A	
1	U234	1.270	0.070	1.402	0.056	0.906	A	W
1	U238	1.300	0.070	1.381	0.079	0.941	A	A

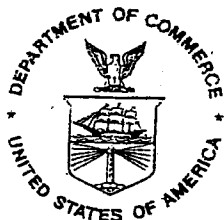
Values for elemental uranium are reported in  $\mu\text{g}/\text{filter}$ , g, or mL. $\text{pCi/g or mL} = \text{Bq} \times 0.027$ 

Evaluation: A=Acceptable, W=Acceptable with Warning, N=Not Acceptable

If the evaluation system is not appropriate for the types of analyses performed in your lab, apply a site specific evaluation.

*Bert M. Coursey*  
Bert Coursey, Acting Leader  
Radioactivity Group  
Physics Laboratory  
29 August 2002  
(continued)





# U.S. DEPARTMENT OF COMMERCE

National Institute of Standards and Technology  
Gaithersburg, MD

## REPORT OF TRACEABILITY

Lockheed Martin Idaho Technologies Company  
Idaho Falls, Idaho

Test Identification NRIP02-GF  
Matrix Description  $^{241}\text{Am}$ ,  $^{238}\text{Pu}$ ,  $^{90}\text{Sr}$ ,  $^{238}\text{U}$ ,  $^{230}\text{Th}$  on Glass-Fiber Filters<sup>1</sup>  
Test Activity Range 30mBq•sample<sup>-1</sup> to 300mBq•sample<sup>-1</sup>  
Reference Time 12:00 EST, April 1, 2002

### Measurement Results

Measurement Results

Nuclide	NIST Value <sup>2,3</sup>		Reported Value <sup>4</sup>		Difference <sup>5</sup>
	Massic Activity Bq·g <sup>-1</sup>	Relative Expanded Uncertainty (%; 2s)	Massic Activity Bq·g <sup>-1</sup>	Relative Expanded Uncertainty (%; 2s)	(±% Bias)
<sup>241</sup> Am	2.437	0.67	2.40	10.6	-1.5
<sup>238</sup> Pu	2.168	1.14	2.00	10.6	-7.8
<sup>238</sup> U	9.527	0.63	9.26	10.8	-2.8
<sup>90</sup> Sr	9.653	0.77	10.01	10.8	+3.7
<sup>230</sup> Th	3.650	0.61	3.66	12.2	+0.3
NA= Not Applicable			NR= Not Reported		
Methods					
Activity Measurements	NIST <sup>6</sup>		Reporting Laboratory <sup>7</sup>		
	Alpha- and Beta-Spectrometry Mass Spectrometry		Alpha- and Beta-Spectrometry		

### Evaluation (per ANSI N42.22)

Nuclide	N42.22 <sup>8</sup>	
	ANSI N42.22 Traceable	Traceability Limit (±Percent)
$^{241}\text{Am}$	Yes	16
$^{238}\text{Pu}$	Yes	15
$^{238}\text{U}$	Yes	16
$^{90}\text{Sr}$	Yes	17
$^{230}\text{Th}$	Yes	18

Samples Distributed 8 March 2002  
Reporting Data Received 16 May 2002

For the Director

*Bert M. Coursey*  
Bert M. Coursey, Acting Leader  
Radioactivity Group  
Physics Laboratory  
19 June 2002  
(continued)



## ADDENDUM – August 2005

This report is an addendum to INL/EXT-05-00361, Amchitka Island Environmental Analysis at Idaho National Laboratory, June 2005.

Included in this report are the radiochemical analysis results of two batches (batch 9 and 10) of samples from phase 3B analyzed in June and July 2005, and the  $^{239}\text{Pu}/^{240}\text{Pu}$  speciation results of selected samples from phase 2 and phase 3. Batch 9 was analyzed for actinides (Pu, U, and Am isotopes) and batch 10 for actinides and Sr-90. The results in this report are the same results that were reported as preliminary results that were sent to CRESPI in June-July 2005. In the preliminary results, batch 10 was reported as batch 11.

Because of the difficulties associated with high concentrations of calcium associated with the 15 gram bone samples, an additional step was used in the strontium (Sr) procedure. Eichrom's Sr resin has a much larger separation factor for Sr over other interfering alkali and alkaline earth metals. Steps 7.9.7-7.9-8 in ACMM-3815<sup>9</sup> were changed to more efficiently separate the high amount of calcium from strontium in the 15 g bone samples. In short, the load solution from the TRU and TEVA columns (step 7.5.8 in ACMM-3816<sup>10</sup>) was loaded onto a column containing 3.6 g of Sr (100-150  $\mu$ ) resin, which had first been conditioned with 4 M  $\text{HNO}_3$ . Enough concentrated  $\text{HNO}_3$  was added to the load solution to adjust the molarity to between 4 and 8 where the separation of strontium over calcium is maximized. The strontium was eluted with 0.05 M  $\text{HNO}_3$  and the strontium analysis as described in ACMM-3815<sup>9</sup> was continued as normal (Section 7.7 and 7.9). Recovery of the  $^{85}\text{Sr}$  isotope dilution standard were >80% indicating that the changes to the method were quite effective.

### Determination of Plutonium Ratios by Inductively Coupled Plasma Mass Spectrometry (ICPMS)

Samples for plutonium ratio determinations were the prepared samples that had been precipitated onto the counting membrane filters using ACMM-3816<sup>10</sup>. The membrane filters were prepared by first removing the identification labels with ethanol. The filters were then placed in a tube with clean forceps, 5 mL of 8N  $\text{HNO}_3$  was added and the tube was spiked with 10  $\mu\text{L}$  of a 10 ng/mL solution of In. The tubes were closed and placed on a rotating tube mixer overnight. The samples were transferred to 10 mL Teflon beakers and evaporated to near dryness on a hot plate, 1 mL of 0.3N  $\text{HNO}_3$  added and the samples transferred to 2 mL snap top poly vials. A total of 6 reagent blank, 6 reagent control, and 21 samples were prepared. Several of the 21 samples were selected as they were believed to be "blind" spikes and blanks.

Samples were introduced to the ICPMS using a CETAC Aridus<sup>TM</sup> desolvating microconcentric nebulizer system under self-aspirating conditions at  $\sim 60 \mu\text{L}/\text{min}$ . The ICPMS was setup to do a survey scan consisting of 10 sweeps from  $m/z$  239.5 to  $m/z$  247.5 with a dwell time of 10 msec for a total acquisition time of 18 seconds. This was followed with a peak jump analysis consisting of three replicate measurements at  $m/z$  115 (In) and  $m/z$  230 thru  $m/z$  243 where each measurement consisted of 100 sweeps with a dwell time of 40 msec for a total acquisition time of 63 seconds per replicate.

Isotope ratios were determined after subtracting the mean reagent blank counts-per-second (cps) at each  $m/z$  of interest. Because the reagent blank contained  $^{242}\text{Pu}$ , the mean reagent blank cps

for this isotope was estimated to be the mean value from m/z 239 and m/z 240 since acid blanks were shown to be comparable at all three masses. The  $^{239}\text{Pu}/^{242}\text{Pu}$ ,  $^{240}\text{Pu}/^{242}\text{Pu}$ , and  $^{240}\text{Pu}/^{239}\text{Pu}$  ratios were determined. Errors were propagated and the appropriate degrees of freedom assigned using Satterwaite's formula. Concentrations in Bq/sample were determined using  $^{242}\text{Pu}$  as the isotope dilution standard and assuming the activities of  $2.30\text{e-}3$ ,  $8.40\text{e-}3$  and  $1.46\text{e-}4$  Bq/g for  $^{239}\text{Pu}$ ,  $^{240}\text{Pu}$ , and  $^{242}\text{Pu}$ , respectively. Once again, the proper number of degrees of freedom were determined by Satterwaite's formula.

Results from the analyses are given in the attached table. Numbers in bold type represent those where the mean value was greater than the standard deviation times the Student t value at  $p=0.01$  for a 1-sided test, i.e. is the result was greater than 0. Analyses were run on two separate days with some samples being analyzed two or more times. All results are listed in the attached result table.

Weapons grade Pu has a m/z 239/240 ratio of at least 13 and more typically 15-20. The ratio for Pu fallout is on average 5.55-6 (239/240). The table below gives an estimate of the total  $^{239+240}\text{Pu}$  activity per sample that would be necessary to have the chance to determine isotopic ratios for  $^{239}\text{Pu}$  and  $^{240}\text{Pu}$  by ICPMS assuming that detection limits of 0.2 pg/mL for  $^{240}\text{Pu}$  and <1 pg/mL  $^{239}\text{Pu}$  can be achieved. Additionally, the assumptions that 100% if the Pu on the filter can be extracted to the final 1 mL volume and that large quantities of  $^{238}\text{U}$ , which may effect the precision on the m/z 239 measurement, are not present. The term "Marginal" as used in the table implies that the isotopes of interest are at the detection limit and "Preferred" assumes 5x the detection limit. The table below implies that for most of the identified samples identified for analysis, the ability to determine a ratio was marginal, at best.

**Comment [wfb1]:** Cooper, L. W., I. L. Larsen, T. M. Beasley, S. S. Dolvin, J. M. Grebmeier, J. M. Kelley, M. Scott and A. Johnson-Pyrtle (1998). "The distribution of radiocesium and plutonium in sea ice-entrained Arctic sediments in relation to potential sources and sinks." *Journal Of Environmental Radioactivity* 39(3): 279-303.

Eisenbud, M and T. Gesell, 1997, *Environmental Radioactivity from Natural, Industrial and Military Sources*, 4th ed., San Diego, CA: Academic Press.

239/240 Atom Ratios	$^{239+240}\text{Pu}$ total alpha activity levels required to determine ratios by ICPMS			
	Marginal but May Be Possible (pCi)	Preferred (pCi)	Marginal but May Be Possible (Bq)	Preferred (Bq)
5	0.11	0.54	0.0040	0.0199
10	0.17	0.85	0.0063	0.0314
15	0.23	1.16	0.0086	0.0429
20	0.29	1.47	0.0109	0.0544
30	0.42	2.09	0.0155	0.0773

Indium was added to the process in an attempt to track the overall efficiency of the technique and for possible use as an internal standard. Ideally, the  $^{115}\text{In}$  cps would have a linear relationship with the  $^{242}\text{Pu}$  within the bounds of the  $^{242}\text{Pu}$  recovery determined by alpha spectroscopy. In general, the indium intensity tracked that of the  $^{242}\text{Pu}$ , however, there were a few samples where the In and  $^{242}\text{Pu}$  did not track as well. Possible explanations for the samples that did not track well may be that the original  $^{242}\text{Pu}$  recovery was low and/or that the process of removing the label with ethanol caused a loss of Pu. Low intensities of In and Pu may be partially due to the original Pu recovery, however, it is suspected that losses to the filter, which remained behind in tact, is the major issue. Interestingly, low In and Pu recoveries were seen more often from reagent blanks and reagent controls.

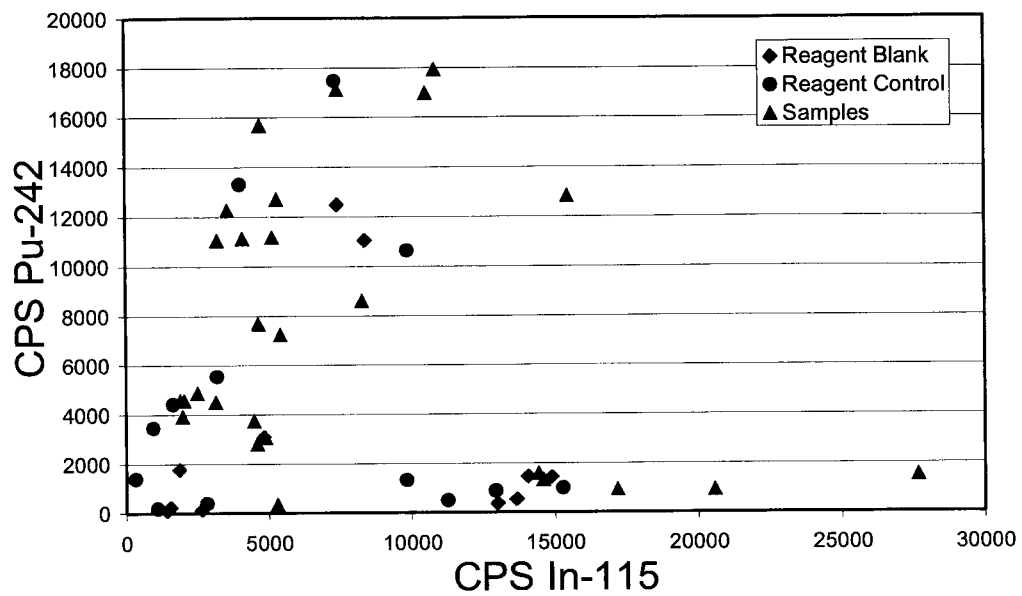
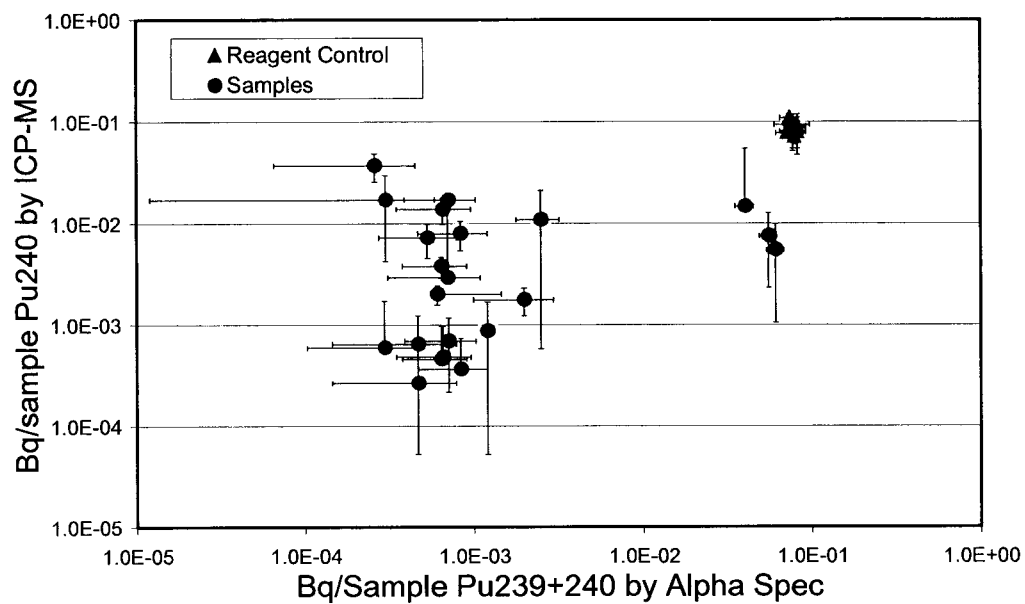
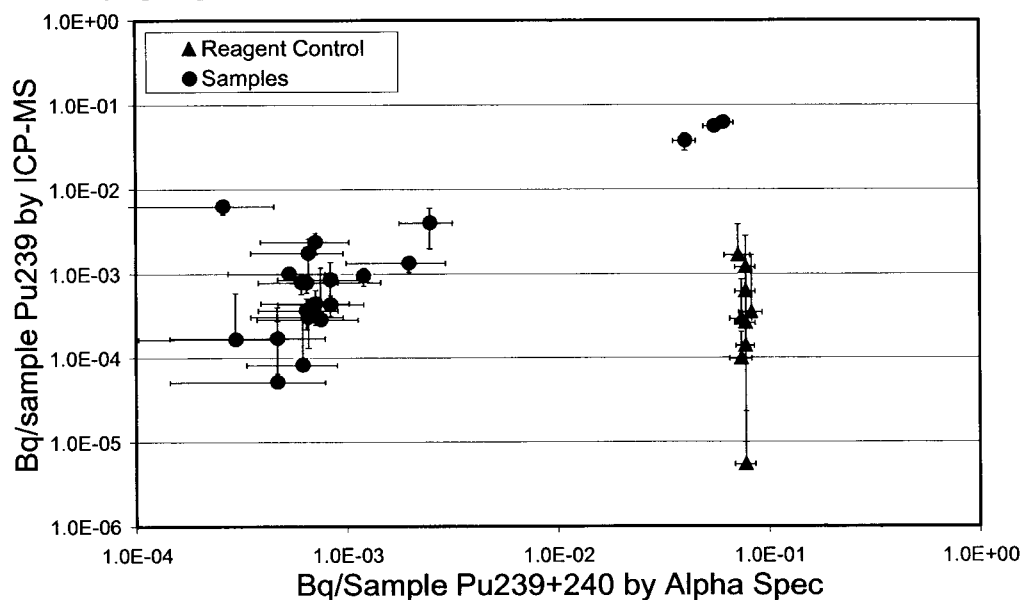


Figure-01 Intensities in cps of  $^{242}\text{Pu}$  vs  $^{115}\text{In}$ .

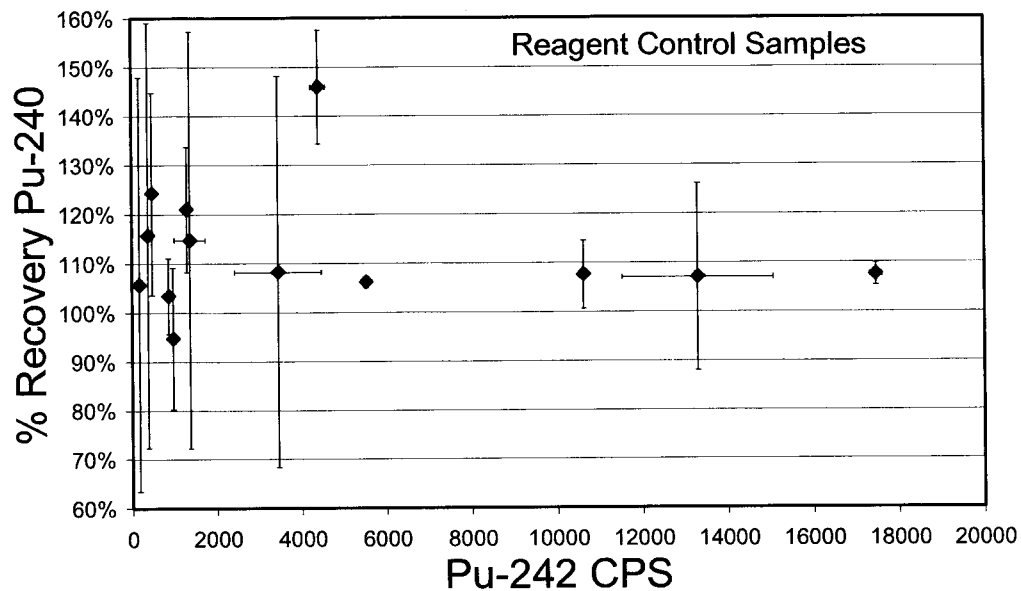
The log-log plot below shows that for the unknown samples, including the suspected blind spike samples, the  $^{240}\text{Pu}$  does not trend with the alpha spectroscopy results. There is a good correlation with the Reagent Control samples to which  $^{240}\text{Pu}$  was spiked. This indicates that little, if any, detectable  $^{240}\text{Pu}$  was found by ICPMS.



The log-log plot below shows that for the unknown samples, including the suspected blind spike samples, the  $^{239}\text{Pu}$  may trend with the alpha spectroscopy results for a couple of the samples. This is primarily noted for the suspected blind spike samples. The results would indicate that the blind spikes were spiked primarily with  $^{239}\text{Pu}$  because there is a very good correlation alpha spectroscopy result. Most of the remainder of the sample results would be considered non-detect, however, one or two do appear to correlate with the alpha spectroscopy result. Because the  $^{239}\text{Pu}/^{240}\text{Pu}$  ratio is expected to generally be greater than 5 and because of the higher activity of  $^{240}\text{Pu}$ ,  $^{239}\text{Pu}$  would be the analyte most likely to be detected by ICPMS when low activity is detected by alpha spectroscopy.



The  $^{240}\text{Pu}$  recovery for the reagent control samples as determined by ICPMS is shown in the figure below plotted against the  $^{242}\text{Pu}$  activity. Not surprisingly, it shows that the lower the  $^{242}\text{Pu}$  concentration, the larger the error in the spike determination. By alpha spectroscopy, the % recovery of  $^{240}\text{Pu}$  was  $103\% \pm 5\%$ . The mean recovery by ICPMS was  $112\% \pm 13\%$ , however, as the  $^{242}\text{Pu}$  intensity gets larger, it appears that the recovery is closer to  $\sim 105\text{-}110\%$ .





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RADIOANALYTICAL ANALYSES DATA PACKAGE

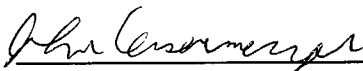
Project Title:	<u>Alpha Analysis for Amchitka (Batch 9)</u>		
Lab Name:	<u>RTC</u>	Case No:	<u>NA</u>
Report No.:	<u>AmchitBatchF9</u>	Method Type:	<u>A/B</u>
Approved SAP No.:	<u>NA</u>	SDG No.:	<u>K-AA-235</u>

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>K-AA-235</u>	<u>02OD-01-A</u>
<u>K-AA-236</u>	<u>02OD-02-A</u>
<u>K-BB-249</u>	<u>02OD-15-A</u>
<u>K-BB-250</u>	<u>02OD-16-A</u>
<u>K-BB-251</u>	<u>02OD-17-A</u>
<u>K-BB-252</u>	<u>02OD-18-A</u>
<u>K-BB-253</u>	<u>02OD-19-A</u>
<u>K-BB-254</u>	<u>02OD-20-A</u>
<u>K-DD-237</u>	<u>02OD-03-A</u>
<u>K-DD-238</u>	<u>02OD-04-A</u>
<u>K-DD-239</u>	<u>02OD-05-A</u>
<u>K-DD-240</u>	<u>02OD-06-A</u>
<u>K-DD-241</u>	<u>02OD-07-A</u>
<u>K-DD-242</u>	<u>02OD-08-A</u>
<u>K-DD-243</u>	<u>02OD-09-A</u>
<u>K-DD-244</u>	<u>02OD-10-A</u>
<u>K-DD-245</u>	<u>02OD-11-A</u>
<u>K-DD-246</u>	<u>02OD-12-A</u>
<u>K-DD-247</u>	<u>02OD-13-A</u>
<u>K-DD-248</u>	<u>02OD-14-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:   
Title: Technical Leader

Name: J. G. Eisenmenger  
Date: 08/08/2005

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-AA-235	020D-01-A	Kelp	U234	+8.56E-04	+1.70E-04	Bq/g	06/12/05	05/09/05	12.76	120.2	01	+3.40E-05	
K-AA-235	020D-01-A	Kelp	U235	+7.75E-05	+3.34E-05	Bq/g	06/12/05	05/09/05	12.76	120.2	01	+4.82E-05	
K-AA-235	020D-01-A	Kelp	U238	+6.57E-04	+1.66E-04	Bq/g	06/12/05	05/09/05	12.76	120.2	01	+3.83E-05	
K-AA-235	020D-01-A	Kelp	PU238	+3.20E-03	+3.94E-04	Bq/g	06/12/05	05/09/05	12.76	107.4	08	+7.52E-05	
K-AA-235	020D-01-A	Kelp	PU239/240	-5.07E-05	+5.84E-05	Bq/g	06/12/05	05/09/05	12.76	107.4	08	+6.94E-05	
K-AA-235	020D-01-A	Kelp	AM241	+4.50E-03	+3.86E-04	Bq/g	06/12/05	05/09/05	12.76	118.7	09	+2.21E-05	
K-AA-235	020D-01-A	Kelp	U236	-6.87E-06	+1.64E-05	Bq/g	06/12/05	05/09/05	12.76	120.2	01	+4.51E-05	
K-AA-236	020D-02-A	Kelp	U234	+4.01E-03	+5.69E-04	Bq/g	06/12/05	05/09/05	12.37	103.5	02	+5.17E-05	
K-AA-236	020D-02-A	Kelp	U235	+2.24E-04	+6.61E-05	Bq/g	06/12/05	05/09/05	12.37	103.5	02	+5.53E-05	
K-AA-236	020D-02-A	Kelp	U238	+3.82E-03	+6.21E-04	Bq/g	06/12/05	05/09/05	12.37	103.5	02	+4.80E-05	
K-AA-236	020D-02-A	Kelp	PU238	-3.81E-06	+7.26E-06	Bq/g	06/12/05	05/09/05	12.37	99.5	08	+7.95E-05	
K-AA-236	020D-02-A	Kelp	PU239/240	-4.59E-05	+6.01E-05	Bq/g	06/12/05	05/09/05	12.37	99.5	08	+7.73E-05	
K-AA-236	020D-02-A	Kelp	AM241	-2.35E-05	+6.39E-05	Bq/g	06/12/05	05/09/05	12.37	96.0	10	+1.46E-05	
K-AA-236	020D-02-A	Kelp	U236	+1.47E-05	+2.23E-05	Bq/g	06/12/05	05/09/05	12.37	103.5	02	+1.71E-05	
K-BB-249	020D-15-A	Kelp	U234	+9.29E-04	+1.71E-04	Bq/g	06/12/05	05/09/05	15	99.9	03	+2.94E-05	
K-BB-249	020D-15-A	Kelp	U235	+4.91E-05	+2.46E-05	Bq/g	06/12/05	05/09/05	15	99.9	03	+4.18E-05	
K-BB-249	020D-15-A	Kelp	U238	+7.30E-04	+1.67E-04	Bq/g	06/12/05	05/09/05	15	99.9	03	+3.91E-05	
K-BB-249	020D-15-A	Kelp	PU238	+5.24E-06	+1.33E-05	Bq/g	06/12/05	05/09/05	15	96.1	11	+1.22E-05	
K-BB-249	020D-15-A	Kelp	PU239/240	+4.06E-05	+5.60E-05	Bq/g	06/12/05	05/09/05	15	96.1	11	+3.43E-05	
K-BB-249	020D-15-A	Kelp	AM241	-2.96E-05	+5.27E-05	Bq/g	06/12/05	05/09/05	15	108.7	15	+1.04E-05	
K-BB-249	020D-15-A	Kelp	U236	-1.58E-05	+1.77E-05	Bq/g	06/12/05	05/09/05	15	99.9	03	+4.80E-05	

See Key for Form I.

Comments:

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## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF9SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-BB-250	020D-16-A	Kelp	U234	+6.56E-04	+1.41E-04	Bq/g	06/12/05	05/09/05	15	103.7	04	+4.38E-05	
K-BB-250	020D-16-A	Kelp	U235	+2.91E-05	+4.30E-05	Bq/g	06/12/05	05/09/05	15	103.7	04	+5.87E-05	
K-BB-250	020D-16-A	Kelp	U238	+5.48E-04	+1.44E-04	Bq/g	06/12/05	05/09/05	15	103.7	04	+3.30E-05	
K-BB-250	020D-16-A	Kelp	PU238	-6.32E-06	+7.19E-06	Bq/g	06/12/05	05/09/05	15	94.8	12	+2.85E-05	
K-BB-250	020D-16-A	Kelp	PU239/240	+9.61E-06	+5.31E-05	Bq/g	06/12/05	05/09/05	15	94.8	12	+2.38E-05	
K-BB-250	020D-16-A	Kelp	AM241	-1.82E-05	+5.75E-05	Bq/g	06/12/05	05/09/05	15	102.7	16	+2.64E-05	
K-BB-250	020D-16-A	Kelp	U236	-1.31E-05	+1.51E-05	Bq/g	06/12/05	05/09/05	15	103.7	04	+3.72E-05	
K-BB-251	020D-17-A	Kelp	U234	+1.95E-03	+4.21E-04	Bq/g	06/12/05	05/09/05	15	39.2	05	+9.79E-05	
K-BB-251	020D-17-A	Kelp	U235	+1.27E-04	+6.87E-05	Bq/g	06/12/05	05/09/05	15	39.2	05	+1.23E-04	
K-BB-251	020D-17-A	Kelp	U238	+1.47E-03	+3.71E-04	Bq/g	06/12/05	05/09/05	15	39.2	05	+7.26E-05	
K-BB-251	020D-17-A	Kelp	PU238	-3.00E-06	+6.02E-06	Bq/g	06/12/05	05/09/05	15	93.8	13	+3.15E-05	
K-BB-251	020D-17-A	Kelp	PU239/240	-3.34E-05	+5.04E-05	Bq/g	06/12/05	05/09/05	15	93.8	13	+2.80E-05	
K-BB-251	020D-17-A	Kelp	AM241	-1.82E-05	+5.75E-05	Bq/g	06/12/05	05/09/05	15	101.5	09	+2.64E-05	
K-BB-251	020D-17-A	Kelp	U236	-1.02E-05	+1.35E-05	Bq/g	06/12/05	05/09/05	15	39.2	05	+1.07E-04	
K-BB-252	020D-18-A	Kelp	U234	+1.87E-03	+2.91E-04	Bq/g	06/12/05	05/09/05	15	112.0	06	+3.04E-05	
K-BB-252	020D-18-A	Kelp	U235	+9.78E-05	+3.81E-05	Bq/g	06/12/05	05/09/05	15	112.0	06	+5.97E-05	
K-BB-252	020D-18-A	Kelp	U238	+1.37E-03	+2.60E-04	Bq/g	06/12/05	05/09/05	15	112.0	06	+3.74E-05	
K-BB-252	020D-18-A	Kelp	PU238	-7.54E-06	+8.47E-06	Bq/g	06/13/05	05/09/05	15	93.7	13	+3.15E-05	
K-BB-252	020D-18-A	Kelp	PU239/240	+7.99E-05	+5.94E-05	Bq/g	06/13/05	05/09/05	15	93.7	13	+2.80E-05	
K-BB-252	020D-18-A	Kelp	AM241	+3.74E-06	+5.39E-05	Bq/g	06/12/05	05/09/05	15	104.6	10	+1.11E-05	
K-BB-252	020D-18-A	Kelp	U236	-1.41E-05	+1.60E-05	Bq/g	06/12/05	05/09/05	15	112.0	06	+3.74E-05	

See Key for Form I.

Comments:

## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTCCase No: NAReport No.: AmchitBatchF9SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-BB-253	020D-19-A	Kelp	U234	+1.75E-03	+2.79E-04	Bq/g	06/12/05	05/09/05	15	94.0	03	+3.13E-05	
K-BB-253	020D-19-A	Kelp	U235	+5.22E-05	+2.60E-05	Bq/g	06/12/05	05/09/05	15	94.0	03	+4.44E-05	
K-BB-253	020D-19-A	Kelp	U238	+1.62E-03	+2.96E-04	Bq/g	06/12/05	05/09/05	15	94.0	03	+4.15E-05	
K-BB-253	020D-19-A	Kelp	PU238	+1.50E-05	+1.23E-05	Bq/g	06/12/05	05/09/05	15	88.4	15	+1.27E-05	
K-BB-253	020D-19-A	Kelp	PU239/240	+1.31E-04	+6.50E-05	Bq/g	06/12/05	05/09/05	15	88.4	15	+2.90E-05	
K-BB-253	020D-19-A	Kelp	AM241	-1.22E-05	+5.30E-05	Bq/g	06/12/05	05/09/05	15	104.1	11	+1.13E-05	
K-BB-253	020D-19-A	Kelp	U236	-8.43E-06	+1.32E-05	Bq/g	06/12/05	05/09/05	15	94.0	03	+4.66E-05	
K-BB-254	020D-20-A	Kelp	U234	+9.49E-04	+1.78E-04	Bq/g	06/12/05	05/09/05	15	108.5	04	+4.45E-05	
K-BB-254	020D-20-A	Kelp	U235	+4.54E-05	+6.12E-05	Bq/g	06/12/05	05/09/05	15	108.5	04	+5.91E-05	
K-BB-254	020D-20-A	Kelp	U238	+6.92E-04	+1.64E-04	Bq/g	06/12/05	05/09/05	15	108.5	04	+3.15E-05	
K-BB-254	020D-20-A	Kelp	PU238	-6.57E-06	+7.43E-06	Bq/g	06/12/05	05/09/05	15	86.3	16	+4.66E-05	
K-BB-254	020D-20-A	Kelp	PU239/240	-2.44E-05	+5.45E-05	Bq/g	06/12/05	05/09/05	15	98.0	12	+2.77E-05	
K-BB-254	020D-20-A	Kelp	AM241	-1.28E-05	+5.98E-05	Bq/g	06/12/05	05/09/05	15	108.5	04	+3.15E-05	
K-BB-254	020D-20-A	Kelp	U236	-6.44E-06	+1.37E-05	Bq/g	06/12/05	05/09/05	15	96.0	03	+3.06E-05	
K-DD-237	020D-03-A	Kelp	U234	+2.10E-04	+7.65E-05	Bq/g	06/12/05	05/09/05	15	96.0	03	+4.35E-05	
K-DD-237	020D-03-A	Kelp	U235	+7.30E-06	+1.32E-05	Bq/g	06/12/05	05/09/05	15	96.0	03	+3.45E-05	
K-DD-237	020D-03-A	Kelp	U238	+7.73E-05	+7.15E-05	Bq/g	06/12/05	05/09/05	15	109.7	09	+2.42E-05	
K-DD-237	020D-03-A	Kelp	PU238	-5.94E-06	+6.86E-06	Bq/g	06/12/05	05/09/05	15	109.7	09	+2.43E-05	
K-DD-237	020D-03-A	Kelp	PU239/240	-3.03E-05	+5.14E-05	Bq/g	06/12/05	05/09/05	15	106.9	11	+1.10E-05	
K-DD-237	020D-03-A	Kelp	AM241	-1.69E-05	+5.27E-05	Bq/g	06/12/05	05/09/05	15	96.0	03	+5.19E-05	
K-DD-237	020D-03-A	Kelp	U236	-7.60E-06	+1.33E-05	Bq/g	06/12/05	05/09/05	15	96.0	03	+5.19E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-DD-238	02OD-04-A	Kelp	U234	+4.36E-04	+1.10E-04	Bq/g	06/12/05	05/09/05	15	105.7	04	+4.57E-05	
K-DD-238	02OD-04-A	Kelp	U235	+2.68E-05	+4.00E-05	Bq/g	06/12/05	05/09/05	15	105.7	04	+6.07E-05	
K-DD-238	02OD-04-A	Kelp	U238	+3.88E-04	+1.19E-04	Bq/g	06/12/05	05/09/05	15	105.7	04	+3.24E-05	
K-DD-238	02OD-04-A	Kelp	PU238	+2.40E-05	+1.47E-05	Bq/g	06/12/05	05/09/05	15	92.0	10	+1.25E-05	
K-DD-238	02OD-04-A	Kelp	PU239/240	-2.45E-05	+5.44E-05	Bq/g	06/12/05	05/09/05	15	92.0	10	+4.04E-05	
K-DD-238	02OD-04-A	Kelp	AM241	-1.59E-05	+5.89E-05	Bq/g	06/12/05	05/09/05	15	91.7	12	+2.97E-05	
K-DD-238	02OD-04-A	Kelp	U236	-6.38E-06	+1.37E-05	Bq/g	06/12/05	05/09/05	15	105.7	04	+3.24E-05	
K-DD-239	02OD-05-A	Kelp	U234	+1.95E-04	+7.60E-05	Bq/g	06/12/05	05/09/05	15	104.4	05	+3.67E-05	
K-DD-239	02OD-05-A	Kelp	U235	+1.44E-05	+2.29E-05	Bq/g	06/12/05	05/09/05	15	104.4	05	+4.62E-05	
K-DD-239	02OD-05-A	Kelp	U238	+1.55E-04	+8.39E-05	Bq/g	06/12/05	05/09/05	15	104.4	05	+2.72E-05	
K-DD-239	02OD-05-A	Kelp	PU238	+5.54E-06	+1.37E-05	Bq/g	06/12/05	05/09/05	15	93.1	11	+1.26E-05	
K-DD-239	02OD-05-A	Kelp	PU239/240	-3.12E-05	+5.12E-05	Bq/g	06/12/05	05/09/05	15	93.1	11	+3.54E-05	
K-DD-239	02OD-05-A	Kelp	AM241	-2.37E-05	+5.52E-05	Bq/g	06/12/05	05/09/05	15	99.6	13	+2.98E-05	
K-DD-239	02OD-05-A	Kelp	U236	-1.45E-05	+1.64E-05	Bq/g	06/12/05	05/09/05	15	104.4	05	+4.02E-05	
K-DD-240	02OD-06-A	Kelp	U234	+2.46E-04	+8.24E-05	Bq/g	06/12/05	05/09/05	15	107.2	06	+3.17E-05	
K-DD-240	02OD-06-A	Kelp	U235	-1.44E-06	+7.29E-06	Bq/g	06/12/05	05/09/05	15	107.2	06	+6.24E-05	
K-DD-240	02OD-06-A	Kelp	U238	+1.29E-04	+7.99E-05	Bq/g	06/12/05	05/09/05	15	107.2	06	+3.91E-05	
K-DD-240	02OD-06-A	Kelp	PU238	+3.26E-06	+1.21E-05	Bq/g	06/12/05	05/09/05	15	90.1	12	+3.00E-05	
K-DD-240	02OD-06-A	Kelp	PU239/240	-1.70E-05	+5.68E-05	Bq/g	06/12/05	05/09/05	15	90.1	12	+2.51E-05	
K-DD-240	02OD-06-A	Kelp	AM241	+7.46E-05	+5.90E-05	Bq/g	06/07/05	05/09/05	15	100.0	14	+2.61E-05	
K-DD-240	02OD-06-A	Kelp	U236	-1.21E-05	+1.44E-05	Bq/g	06/12/05	05/09/05	15	107.2	06	+4.48E-05	

See Key for Form I.

Comments:

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## RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-DD-241	020D-07-A	Kelp	U234	+1.57E-04	+6.92E-05	Bq/g	06/12/05	05/09/05	15	112.5	01	+3.09E-05	
K-DD-241	020D-07-A	Kelp	U235	+7.36E-06	+1.33E-05	Bq/g	06/12/05	05/09/05	15	112.5	01	+4.39E-05	
K-DD-241	020D-07-A	Kelp	U238	+5.75E-05	+6.89E-05	Bq/g	06/12/05	05/09/05	15	112.5	01	+3.81E-05	
K-DD-241	020D-07-A	Kelp	PU238	-7.69E-06	+8.65E-06	Bq/g	06/12/05	05/09/05	15	90.0	13	+3.28E-05	
K-DD-241	020D-07-A	Kelp	PU239/240	-2.97E-05	+5.17E-05	Bq/g	06/12/05	05/09/05	15	90.0	13	+3.28E-05	
K-DD-241	020D-07-A	Kelp	AM241	-1.43E-06	+5.38E-05	Bq/g	06/12/05	05/09/05	15	93.3	15	+1.21E-05	
K-DD-241	020D-07-A	Kelp	U236	-5.65E-06	+1.41E-05	Bq/g	06/12/05	05/09/05	15	112.5	01	+4.10E-05	
K-DD-242	020D-08-A	Kelp	U234	+3.57E-04	+1.00E-04	Bq/g	06/12/05	05/09/05	15	99.7	02	+4.11E-05	
K-DD-242	020D-08-A	Kelp	U235	+3.51E-05	+4.81E-05	Bq/g	06/12/05	05/09/05	15	99.7	02	+4.73E-05	
K-DD-242	020D-08-A	Kelp	U238	+3.30E-04	+1.11E-04	Bq/g	06/12/05	05/09/05	15	99.7	02	+4.11E-05	
K-DD-242	020D-08-A	Kelp	PU238	-6.20E-06	+7.08E-06	Bq/g	06/12/05	05/09/05	15	95.5	14	+2.71E-05	
K-DD-242	020D-08-A	Kelp	PU239/240	-1.03E-05	+5.14E-05	Bq/g	06/12/05	05/09/05	15	95.5	14	+2.27E-05	
K-DD-242	020D-08-A	Kelp	AM241	-2.31E-05	+5.53E-05	Bq/g	06/12/05	05/09/05	15	107.4	16	+2.53E-05	
K-DD-242	020D-08-A	Kelp	U236	-3.30E-06	+1.55E-05	Bq/g	06/12/05	05/09/05	15	99.7	02	+1.46E-05	
K-DD-243	020D-09-A	Kelp	U234	+3.80E-04	+1.00E-04	Bq/g	06/12/05	05/09/05	15	96.8	03	+3.04E-05	
K-DD-243	020D-09-A	Kelp	U235	+9.99E-06	+1.69E-05	Bq/g	06/12/05	05/09/05	15	96.8	03	+5.08E-05	
K-DD-243	020D-09-A	Kelp	U238	+4.05E-04	+1.20E-04	Bq/g	06/12/05	05/09/05	15	96.8	03	+3.42E-05	
K-DD-243	020D-09-A	Kelp	PU238	+5.61E-06	+1.38E-05	Bq/g	06/12/05	05/09/05	15	88.6	15	+1.27E-05	
K-DD-243	020D-09-A	Kelp	PU239/240	-2.38E-05	+5.44E-05	Bq/g	06/12/05	05/09/05	15	88.6	15	+2.89E-05	
K-DD-243	020D-09-A	Kelp	AM241	-2.86E-05	+5.33E-05	Bq/g	06/12/05	05/09/05	15	86.0	09	+2.60E-05	
K-DD-243	020D-09-A	Kelp	U236	-1.11E-05	+1.38E-05	Bq/g	06/12/05	05/09/05	15	96.8	03	+4.95E-05	

See Key for Form I.

Comments:

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# RADIOANALYTICAL ANALYSES DATA PACKAGE

08/08/05

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-DD-244	020D-10-A	Kelp	U234	+2.64E-04	+8.72E-05	Bq/g	06/12/05	05/09/05	15	100.8	04	+4.50E-05	
K-DD-244	020D-10-A	Kelp	U235	+7.31E-06	+1.34E-05	Bq/g	06/12/05	05/09/05	15	100.8	04	+6.36E-05	
K-DD-244	020D-10-A	Kelp	U238	+2.25E-04	+9.56E-05	Bq/g	06/12/05	05/09/05	15	100.8	04	+3.39E-05	
K-DD-244	020D-10-A	Kelp	PU238	+3.58E-06	+1.26E-05	Bq/g	06/12/05	05/09/05	15	86.1	16	+3.14E-05	
K-DD-244	020D-10-A	Kelp	PU239/240	-1.93E-05	+5.78E-05	Bq/g	06/12/05	05/09/05	15	86.1	16	+4.68E-05	
K-DD-244	020D-10-A	Kelp	AM241	-1.88E-05	+5.27E-05	Bq/g	06/12/05	05/09/05	15	93.1	10	+1.24E-05	
K-DD-244	020D-10-A	Kelp	U236	-7.70E-07	+1.81E-05	Bq/g	06/12/05	05/09/05	15	100.8	04	+3.39E-05	
K-DD-245	020D-11-A	Kelp	U234	+5.78E-04	+1.28E-04	Bq/g	06/12/05	05/09/05	15	107.4	05	+3.57E-05	
K-DD-245	020D-11-A	Kelp	U235	+2.04E-05	+3.08E-05	Bq/g	06/12/05	05/09/05	15	107.4	05	+4.49E-05	
K-DD-245	020D-11-A	Kelp	U238	+4.71E-04	+1.31E-04	Bq/g	06/12/05	05/09/05	15	107.4	05	+2.65E-05	
K-DD-245	020D-11-A	Kelp	PU238	-4.93E-08	+8.04E-06	Bq/g	06/12/05	05/09/05	15	103.6	07	+1.00E-05	
K-DD-245	020D-11-A	Kelp	PU239/240	-3.25E-05	+5.04E-05	Bq/g	06/12/05	05/09/05	15	103.6	07	+1.00E-05	
K-DD-245	020D-11-A	Kelp	AM241	-5.44E-06	+5.38E-05	Bq/g	06/12/05	05/09/05	15	82.1	11	+1.43E-05	
K-DD-245	020D-11-A	Kelp	U236	-6.43E-06	+1.37E-05	Bq/g	06/12/05	05/09/05	15	107.4	05	+3.17E-05	
K-DD-246	020D-12-A	Kelp	U234	+3.05E-04	+9.01E-05	Bq/g	06/12/05	05/09/05	15	109.5	06	+3.11E-05	
K-DD-246	020D-12-A	Kelp	U235	+1.48E-05	+2.36E-05	Bq/g	06/12/05	05/09/05	15	109.5	06	+5.52E-05	
K-DD-246	020D-12-A	Kelp	U238	+2.80E-04	+1.02E-04	Bq/g	06/12/05	05/09/05	15	109.5	06	+3.83E-05	
K-DD-246	020D-12-A	Kelp	PU238	+3.15E-06	+1.09E-05	Bq/g	06/12/05	05/09/05	15	111.1	07	+9.37E-06	
K-DD-246	020D-12-A	Kelp	PU239/240	-2.26E-05	+5.02E-05	Bq/g	06/12/05	05/09/05	15	111.1	07	+9.38E-06	
K-DD-246	020D-12-A	Kelp	AM241	-8.33E-06	+5.36E-05	Bq/g	06/12/05	05/09/05	15	98.1	12	+2.77E-05	
K-DD-246	020D-12-A	Kelp	U236	-9.27E-06	+1.33E-05	Bq/g	06/12/05	05/09/05	15	109.5	06	+3.83E-05	

See Key for Form I.

Comments:

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RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
K-DD-247	020D-13-A	Kelp	U234	+2.57E-04	+8.54E-05	Bq/g	06/12/05	05/09/05	15	105.2	01	+4.07E-05	
K-DD-247	020D-13-A	Kelp	U235	+2.13E-05	+3.21E-05	Bq/g	06/12/05	05/09/05	15	105.2	01	+4.69E-05	
K-DD-247	020D-13-A	Kelp	U238	+1.33E-04	+8.12E-05	Bq/g	06/12/05	05/09/05	15	105.2	01	+4.07E-05	
K-DD-247	020D-13-A	Kelp	PU238	+7.31E-06	+1.72E-05	Bq/g	06/12/05	05/09/05	15	95.2	09	+2.79E-05	
K-DD-247	020D-13-A	Kelp	PU239/240	+2.83E-06	+5.26E-05	Bq/g	06/12/05	05/09/05	15	95.2	09	+2.80E-05	
K-DD-247	020D-13-A	Kelp	AM241	-1.84E-05	+5.78E-05	Bq/g	06/12/05	05/09/05	15	94.4	13	+3.14E-05	
K-DD-247	020D-13-A	Kelp	U236	-1.46E-05	+1.65E-05	Bq/g	06/12/05	05/09/05	15	105.2	01	+4.07E-05	
K-DD-248	020D-14-A	Kelp	U234	+4.21E-04	+1.07E-04	Bq/g	06/12/05	05/09/05	15	105.1	02	+3.90E-05	
K-DD-248	020D-14-A	Kelp	U235	+2.69E-05	+3.86E-05	Bq/g	06/12/05	05/09/05	15	105.1	02	+4.49E-05	
K-DD-248	020D-14-A	Kelp	U238	+3.02E-04	+1.05E-04	Bq/g	06/12/05	05/09/05	15	105.1	02	+3.90E-05	
K-DD-248	020D-14-A	Kelp	PU238	+1.23E-04	+3.57E-05	Bq/g	06/12/05	05/09/05	15	86.4	10	+2.54E-05	
K-DD-248	020D-14-A	Kelp	PU239/240	-7.33E-06	+6.51E-05	Bq/g	06/12/05	05/09/05	15	86.4	10	+4.04E-05	
K-DD-248	020D-14-A	Kelp	AM241	-2.65E-05	+5.40E-05	Bq/g	06/12/05	05/09/05	15	95.9	14	+2.72E-05	
K-DD-248	020D-14-A	Kelp	U236	+1.53E-06	+1.93E-05	Bq/g	06/12/05	05/09/05	15	105.1	02	+1.38E-05	

See Key for Form I.

Comments:

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# RADIOANALYTICAL ANALYSES DATA PACKAGE

08/08/2005

Lab Name: RTC  
Report No.: AmchitBatchF9

Case No: NA  
SDG No.: K-AA-235

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer+/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	U234	+1.19E-03	+5.61E-04	NA	NA	Bq/spL	NA%	06/12/2005	61.9%	02	+9.08E-04	
REAGENT	BLK	U235	-6.40E-05	-1.03E-04	NA	NA	Bq/spL	NA%	06/12/2005	61.9%	02	+1.34E-03	
REAGENT	BLK	U238	+1.68E-03	+7.19E-04	NA	NA	Bq/spL	NA%	06/12/2005	61.9%	02	+9.94E-04	
REAGENT	BLK	PU238	+5.64E-05	+8.86E-05	NA	NA	Bq/spL	NA%	06/13/2005	49.7%	14	+7.84E-04	
REAGENT	BLK	PU239/240	+6.00E-04	+7.41E-04	NA	NA	Bq/spL	NA%	06/13/2005	49.7%	14	+6.55E-04	
REAGENT	BLK	AM241	+5.59E-04	+7.76E-04	NA	NA	Bq/spL	NA%	06/12/2005	47.7%	13	+9.33E-04	
REAGENT	BLK	U236	+1.30E-04	+1.99E-04	NA	NA	Bq/spL	NA%	06/12/2005	61.9%	02	+3.54E-04	
REAGENT	LCS	U238	+2.08E-01	+3.07E-02	+1.99E-01	NA	Bq/mL	104.1%	06/12/2005	90.5%	08	+1.12E-03	
REAGENT	LCS	PU239/240	+1.46E-01	+1.72E-02	+1.50E-01	NA	Bq/mL	97.3%	06/12/2005	89.8%	08	+2.18E-03	
REAGENT	LCS	AM241	+1.47E-01	+1.17E-02	+1.55E-01	NA	Bq/mL	94.8%	06/12/2005	104.3%	07	+3.01E-04	

See Key for Form II.

Comments:

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Project: **Alpha Analysis for Amchitka Island (Batch 9)**  
 Laboratory: RTC  
 Report #: AmchitBatchF9  
 SDG#: K-AA-235

## Summary of 2 and 3 sigma activities

Below are the results for U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 9 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-AA-235	02OD-01-A	AM241	4.50E-03	3.86E-04	11.7
K-AA-235	02OD-01-A	PU238	3.20E-03	3.94E-04	8.1
K-AA-235	02OD-01-A	U234	8.56E-04	1.70E-04	5.0
K-AA-235	02OD-01-A	U235	7.75E-05	3.34E-05	2.3
K-AA-235	02OD-01-A	U238	6.57E-04	1.66E-04	4.0
K-AA-236	02OD-02-A	U234	4.01E-03	5.69E-04	7.0
K-AA-236	02OD-02-A	U235	2.24E-04	6.61E-05	3.4
K-AA-236	02OD-02-A	U238	3.82E-03	6.21E-04	6.2
K-DD-237	02OD-03-A	U234	2.10E-04	7.65E-05	2.7
K-DD-238	02OD-04-A	U234	4.36E-04	1.10E-04	4.0
K-DD-238	02OD-04-A	U238	3.88E-04	1.19E-04	3.3
K-DD-239	02OD-05-A	U234	1.95E-04	7.60E-05	2.6
K-DD-240	02OD-06-A	U234	2.46E-04	8.24E-05	3.0
K-DD-241	02OD-07-A	U234	1.57E-04	6.92E-05	2.3
K-DD-242	02OD-08-A	U234	3.57E-04	1.00E-04	3.6
K-DD-242	02OD-08-A	U238	3.30E-04	1.11E-04	3.0
K-DD-243	02OD-09-A	U234	3.80E-04	1.00E-04	3.8
K-DD-243	02OD-09-A	U238	4.05E-04	1.20E-04	3.4
K-DD-244	02OD-10-A	U234	2.64E-04	8.72E-05	3.0
K-DD-244	02OD-10-A	U238	2.25E-04	9.56E-05	2.4
K-DD-245	02OD-11-A	U234	5.78E-04	1.28E-04	4.5
K-DD-245	02OD-11-A	U238	4.71E-04	1.31E-04	3.6

Customer ID	Lab ID	Isotope	Result Bq/g	Uncertainty Bq/g	Result/ Uncertainty
K-DD-246	02OD-12-A	U234	3.05E-04	9.01E-05	3.4
K-DD-246	02OD-12-A	U238	2.80E-04	1.02E-04	2.7
K-DD-247	02OD-13-A	U234	2.57E-04	8.54E-05	3.0
K-DD-248	02OD-14-A	PU238	1.23E-04	3.57E-05	3.4
K-DD-248	02OD-14-A	U234	4.21E-04	1.07E-04	3.9
K-DD-248	02OD-14-A	U238	3.02E-04	1.05E-04	2.9
K-BB-249	02OD-15-A	U234	9.29E-04	1.71E-04	5.4
K-BB-249	02OD-15-A	U235	4.91E-05	2.46E-05	2.0
K-BB-249	02OD-15-A	U238	7.30E-04	1.67E-04	4.4
K-BB-250	02OD-16-A	U234	6.56E-04	1.41E-04	4.7
K-BB-250	02OD-16-A	U238	5.48E-04	1.44E-04	3.8
K-BB-251	02OD-17-A	U234	1.95E-03	4.21E-04	4.6
K-BB-251	02OD-17-A	U238	1.47E-03	3.71E-04	4.0
K-BB-252	02OD-18-A	U234	1.87E-03	2.91E-04	6.4
K-BB-252	02OD-18-A	U235	9.78E-05	3.81E-05	2.6
K-BB-252	02OD-18-A	U238	1.37E-03	2.60E-04	5.3
K-BB-253	02OD-19-A	PU239/240	1.31E-04	6.50E-05	2.0
K-BB-253	02OD-19-A	U234	1.75E-03	2.79E-04	6.3
K-BB-253	02OD-19-A	U235	5.22E-05	2.60E-05	2.0
K-BB-253	02OD-19-A	U238	1.62E-03	2.96E-04	5.5
K-BB-254	02OD-20-A	U234	9.49E-04	1.78E-04	5.3
K-BB-254	02OD-20-A	U238	6.92E-04	1.64E-04	4.2

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

COVER PAGE  
RADIOANALYTICAL ANALYSES DATA PACKAGE


Project Title:	<u>Alpha and Sr-90 Analysis for Amchitka Island (Batch 10)</u>		
Lab Name:	<u>RTC</u>	Case No:	<u>NA</u>
Report No.:	<u>AmchitBatchF10</u>	Method Type:	<u>A/B</u>
Approved SAP No.:	<u>NA</u>	SDG No.:	<u>B-K-255</u>

SAMPLE NUMBERS

Customer Sample ID	Lab Sample ID
<u>B-H-262</u>	<u>02RB-08-A</u>
<u>B-H-263</u>	<u>02RB-09-A</u>
<u>B-H-264</u>	<u>02RB-10-A</u>
<u>B-K-255</u>	<u>02RB-01-A</u>
<u>B-K-256</u>	<u>02RB-02-A</u>
<u>B-K-257</u>	<u>02RB-03-A</u>
<u>B-K-258</u>	<u>02RB-04-A</u>
<u>B-K-259</u>	<u>02RB-05-A</u>
<u>B-K-260</u>	<u>02RB-06-A</u>
<u>B-K-261</u>	<u>02RB-07-A</u>

Comments: \_\_\_\_\_  
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Release of the data contained in this data package has been authorized by the laboratory manager or the manager's designee, as verified by the following signature:

Signature:	<u></u>	Name:	<u>J. G. Eisenmenger</u>
Title:	<u>Technical Leader</u>	Date:	<u>08/08/2005</u>

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF10

Case No: NA  
SDG No.: B-K-255

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-H-262	02RB-08-A	Bone	SR90	+2.21E-04	+5.42E-04	Bq/g	07/26/05	06/13/05	15	86.9	A1	+2.21E-03	
B-H-262	02RB-08-A	Bone	U234	+1.20E-03	+2.91E-04	Bq/g	07/19/05	06/13/05	15	54.3	06	+7.06E-05	
B-H-262	02RB-08-A	Bone	U235	+5.69E-05	+9.18E-05	Bq/g	07/19/05	06/13/05	15	54.3	06	+7.90E-05	
B-H-262	02RB-08-A	Bone	U238	+9.00E-04	+2.59E-04	Bq/g	07/19/05	06/13/05	15	54.3	06	+8.32E-05	
B-H-262	02RB-08-A	Bone	PU238	+3.01E-06	+7.32E-06	Bq/g	07/18/05	06/13/05	15	42.7	13	+6.14E-05	
B-H-262	02RB-08-A	Bone	PU239/240	-3.01E-05	+3.42E-05	Bq/g	07/18/05	06/13/05	15	42.7	13	+9.16E-05	
B-H-262	02RB-08-A	Bone	AM241	-6.60E-07	+3.00E-05	Bq/g	07/20/05	06/13/05	15	51.9	14	+4.20E-05	
B-H-262	02RB-08-A	Bone	U236	+3.33E-05	+5.93E-05	Bq/g	07/19/05	06/13/05	15	54.3	06	+7.73E-05	
B-H-263	02RB-09-A	Bone	SR90	-8.48E-04	+5.03E-04	Bq/g	07/26/05	06/13/05	15	91.6	A2	+2.09E-03	
B-H-263	02RB-09-A	Bone	U234	+1.94E-04	+1.15E-04	Bq/g	07/19/05	06/13/05	15	95.7	03	+3.07E-05	
B-H-263	02RB-09-A	Bone	U235	-1.44E-05	+2.03E-05	Bq/g	07/19/05	06/13/05	15	95.7	03	+3.24E-05	
B-H-263	02RB-09-A	Bone	U238	+1.79E-04	+1.18E-04	Bq/g	07/19/05	06/13/05	15	95.7	03	+5.01E-05	
B-H-263	02RB-09-A	Bone	PU238	+5.22E-06	+1.05E-05	Bq/g	07/18/05	06/13/05	15	45.8	14	+4.74E-05	
B-H-263	02RB-09-A	Bone	PU239/240	-1.66E-05	+3.12E-05	Bq/g	07/18/05	06/13/05	15	45.8	14	+5.67E-05	
B-H-263	02RB-09-A	Bone	AM241	-3.47E-06	+2.71E-05	Bq/g	07/20/05	06/13/05	15	95.1	11	+2.83E-05	
B-H-263	02RB-09-A	Bone	U236	-3.99E-06	+1.06E-05	Bq/g	07/19/05	06/13/05	15	95.7	03	+3.07E-05	
B-H-264	02RB-10-A	Bone	SR90	-8.32E-04	+5.55E-04	Bq/g	07/26/05	06/13/05	15	84.4	A3	+2.29E-03	
B-H-264	02RB-10-A	Bone	U234	+1.39E-04	+1.10E-04	Bq/g	07/19/05	06/13/05	15	108.9	04	+4.67E-05	
B-H-264	02RB-10-A	Bone	U235	-3.44E-06	+2.46E-05	Bq/g	07/19/05	06/13/05	15	108.9	04	+3.95E-05	
B-H-264	02RB-10-A	Bone	U238	+1.25E-04	+1.11E-04	Bq/g	07/19/05	06/13/05	15	108.9	04	+3.14E-05	
B-H-264	02RB-10-A	Bone	PU238	-2.77E-06	+3.11E-06	Bq/g	07/18/05	06/13/05	15	84.8	15	+2.53E-05	

See Key for Form I.

Comments:

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RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF10

Case No: NA  
SDG No.: B-K-255

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-H-264	02RB-10-A	Bone	PU239/240	-1.00E-05	+3.45E-05	Bq/g	07/18/05	06/13/05	15	84.8	15	+3.41E-05	
B-H-264	02RB-10-A	Bone	AM241	-2.79E-06	+2.77E-05	Bq/g	07/20/05	06/13/05	15	90.7	12	+3.00E-05	
B-H-264	02RB-10-A	Bone	U236	+7.64E-06	+2.25E-05	Bq/g	07/19/05	06/13/05	15	108.9	04	+2.62E-05	
B-K-255	02RB-01-A	Bone	SR90	-2.35E-04	+4.53E-04	Bq/g	07/26/05	06/13/05	15	88.0	A1	+1.86E-03	
B-K-255	02RB-01-A	Bone	U234	+6.26E-05	+1.04E-04	Bq/g	07/18/05	06/13/05	15	100.9	01	+4.86E-05	
B-K-255	02RB-01-A	Bone	U235	-4.49E-06	+2.38E-05	Bq/g	07/18/05	06/13/05	15	100.9	01	+4.89E-05	
B-K-255	02RB-01-A	Bone	U238	+5.56E-05	+1.05E-04	Bq/g	07/18/05	06/13/05	15	100.9	01	+4.57E-05	
B-K-255	02RB-01-A	Bone	PU238	+2.13E-05	+3.46E-05	Bq/g	07/20/05	06/13/05	15	16.9	07	+6.16E-05	
B-K-255	02RB-01-A	Bone	PU239/240	-1.05E-05	+3.46E-05	Bq/g	07/20/05	06/13/05	15	16.9	07	+1.40E-04	
B-K-255	02RB-01-A	Bone	AM241	-7.14E-06	+2.44E-05	Bq/g	07/19/05	06/13/05	15	83.5	11	+3.22E-05	
B-K-255	02RB-01-A	Bone	U236	+3.09E-07	+1.43E-05	Bq/g	07/18/05	06/13/05	15	100.9	01	+3.88E-05	
B-K-256	02RB-02-A	Bone	SR90	-6.54E-04	+4.95E-04	Bq/g	07/26/05	06/13/05	15	79.5	A2	+2.05E-03	
B-K-256	02RB-02-A	Bone	U234	+4.08E-05	+1.02E-04	Bq/g	07/18/05	06/13/05	15	88.6	02	+4.62E-05	
B-K-256	02RB-02-A	Bone	U235	-5.89E-06	+2.28E-05	Bq/g	07/18/05	06/13/05	15	88.6	02	+5.82E-05	
B-K-256	02RB-02-A	Bone	U238	+5.85E-05	+1.07E-04	Bq/g	07/18/05	06/13/05	15	88.6	02	+4.98E-05	
B-K-256	02RB-02-A	Bone	PU238	+8.44E-06	+1.48E-05	Bq/g	07/19/05	06/13/05	15	74.6	10	+2.95E-05	
B-K-256	02RB-02-A	Bone	PU239/240	-6.70E-06	+3.68E-05	Bq/g	07/19/05	06/13/05	15	74.6	10	+3.53E-05	
B-K-256	02RB-02-A	Bone	AM241	-1.25E-05	+2.19E-05	Bq/g	07/19/05	06/13/05	15	92.9	12	+2.92E-05	
B-K-256	02RB-02-A	Bone	U236	-3.50E-06	+1.09E-05	Bq/g	07/18/05	06/13/05	15	88.6	02	+3.75E-05	
B-K-257	02RB-03-A	Bone	SR90	+1.81E-03	+4.88E-04	Bq/g	07/26/05	06/13/05	15	86.7	A3	+1.90E-03	
B-K-257	02RB-03-A	Bone	U234	+1.64E-04	+1.13E-04	Bq/g	07/18/05	06/13/05	15	89.3	03	+3.30E-05	

See Key for Form I.

Comments: \_\_\_\_\_  
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Lab Name: RTC

Report No.: AmchitBatchF10

Case No: NA

SDG No.: B-K-255

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uner +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-257	02RB-03-A	Bone	U235	+3.06E-05	+3.04E-05	Bq/g	07/18/05	06/13/05	15	89.3	03	+4.15E-05	
B-K-257	02RB-03-A	Bone	U238	+1.57E-04	+1.17E-04	Bq/g	07/18/05	06/13/05	15	89.3	03	+5.37E-05	
B-K-257	02RB-03-A	Bone	PU238	-2.76E-06	+3.10E-06	Bq/g	07/18/05	06/13/05	15	79.0	07	+2.51E-05	
B-K-257	02RB-03-A	Bone	PU239/240	-1.36E-05	+3.24E-05	Bq/g	07/18/05	06/13/05	15	79.0	07	+3.00E-05	
B-K-257	02RB-03-A	Bone	AM241	-7.77E-06	+2.40E-05	Bq/g	07/19/05	06/13/05	15	89.3	13	+2.95E-05	
B-K-257	02RB-03-A	Bone	U236	+1.51E-06	+1.56E-05	Bq/g	07/18/05	06/13/05	15	89.3	03	+3.30E-05	
B-K-258	02RB-04-A	Bone	SR90	-3.24E-04	+4.52E-04	Bq/g	07/26/05	06/13/05	15	88.0	A4	+1.86E-03	
B-K-258	02RB-04-A	Bone	U234	+1.15E-04	+1.09E-04	Bq/g	07/18/05	06/13/05	15	100.2	04	+4.82E-05	
B-K-258	02RB-04-A	Bone	U235	-9.60E-06	+2.07E-05	Bq/g	07/18/05	06/13/05	15	100.2	04	+4.30E-05	
B-K-258	02RB-04-A	Bone	U238	+1.59E-04	+1.17E-04	Bq/g	07/18/05	06/13/05	15	100.2	04	+2.85E-05	
B-K-258	02RB-04-A	Bone	PU238	-3.92E-06	+4.61E-06	Bq/g	07/18/05	06/13/05	15	47.7	09	+4.67E-05	
B-K-258	02RB-04-A	Bone	PU239/240	-2.58E-06	+3.91E-05	Bq/g	07/18/05	06/13/05	15	47.7	09	+2.45E-05	
B-K-258	02RB-04-A	Bone	AM241	+8.29E-06	+3.51E-05	Bq/g	07/19/05	06/13/05	15	86.9	14	+2.51E-05	
B-K-258	02RB-04-A	Bone	U236	-7.74E-06	+1.03E-05	Bq/g	07/18/05	06/13/05	15	100.2	04	+2.85E-05	
B-K-259	02RB-05-A	Bone	SR90	-1.41E-03	+4.92E-04	Bq/g	07/26/05	06/13/05	15	82.2	B1	+2.02E-03	
B-K-259	02RB-05-A	Bone	U234	+1.19E-04	+1.10E-04	Bq/g	07/18/05	06/13/05	15	94.8	05	+4.04E-05	
B-K-259	02RB-05-A	Bone	U235	-8.96E-07	+2.72E-05	Bq/g	07/18/05	06/13/05	15	94.8	05	+6.00E-05	
B-K-259	02RB-05-A	Bone	U238	+2.30E-04	+1.28E-04	Bq/g	07/18/05	06/13/05	15	94.8	05	+4.43E-05	
B-K-259	02RB-05-A	Bone	PU238	+2.24E-05	+3.61E-05	Bq/g	07/18/05	06/13/05	15	30.8	10	+7.15E-05	
B-K-259	02RB-05-A	Bone	PU239/240	-1.83E-05	+3.08E-05	Bq/g	07/18/05	06/13/05	15	30.8	10	+9.64E-05	
B-K-259	02RB-05-A	Bone	AM241	+4.70E-07	+3.06E-05	Bq/g	07/19/05	06/13/05	15	87.4	15	+3.32E-05	

See Key for Form I.

Comments:

RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF10

Case No: NA  
SDG No.: B-K-255

Customer ID	Lab Sample ID	Sample Matrix	Anal Type	Sample Value	Sample Uncer +/-	Units	Anal Date	Sample Date	Sample Size	Chem Yield	Detector ID	MDA	DQF
B-K-259	02RB-05-A	Bone	U236	+6.40E-06	+2.17E-05	Bq/g	07/18/05	06/13/05	15	94.8	05	+4.04E-05	
B-K-260	02RB-06-A	Bone	SR90	-6.02E-04	+4.79E-04	Bq/g	07/26/05	06/13/05	15	82.8	B2	+1.98E-03	
B-K-260	02RB-06-A	Bone	U234	+2.90E-04	+1.30E-04	Bq/g	07/18/05	06/13/05	15	96.5	06	+3.97E-05	
B-K-260	02RB-06-A	Bone	U235	+1.40E-05	+4.17E-05	Bq/g	07/18/05	06/13/05	15	96.5	06	+3.71E-05	
B-K-260	02RB-06-A	Bone	U238	+2.49E-04	+1.30E-04	Bq/g	07/18/05	06/13/05	15	96.5	06	+4.68E-05	
B-K-260	02RB-06-A	Bone	PU238	-4.29E-06	+5.13E-06	Bq/g	07/18/05	06/13/05	15	83.4	11	+3.20E-05	
B-K-260	02RB-06-A	Bone	PU239/240	-1.98E-05	+3.06E-05	Bq/g	07/18/05	06/13/05	15	83.4	11	+3.61E-05	
B-K-260	02RB-06-A	Bone	AM241	-8.07E-06	+2.39E-05	Bq/g	07/19/05	06/13/05	15	77.8	16	+3.93E-05	
B-K-260	02RB-06-A	Bone	U236	-1.25E-05	+1.45E-05	Bq/g	07/18/05	06/13/05	15	96.5	06	+4.35E-05	
B-K-261	02RB-07-A	Bone	SR90	+9.04E-04	+4.57E-04	Bq/g	07/26/05	06/13/05	15	88.1	B3	+1.84E-03	
B-K-261	02RB-07-A	Bone	U234	+2.43E-04	+1.25E-04	Bq/g	07/19/05	06/13/05	15	97.2	01	+4.41E-05	
B-K-261	02RB-07-A	Bone	U235	+1.04E-05	+3.95E-05	Bq/g	07/19/05	06/13/05	15	97.2	01	+5.07E-05	
B-K-261	02RB-07-A	Bone	U238	+2.57E-04	+1.31E-04	Bq/g	07/19/05	06/13/05	15	97.2	01	+4.41E-05	
B-K-261	02RB-07-A	Bone	PU238	+2.46E-06	+6.38E-06	Bq/g	07/18/05	06/13/05	15	81.7	12	+2.77E-05	
B-K-261	02RB-07-A	Bone	PU239/240	-1.29E-05	+3.28E-05	Bq/g	07/18/05	06/13/05	15	81.7	12	+3.31E-05	
B-K-261	02RB-07-A	Bone	AM241	-6.06E-06	+2.51E-05	Bq/g	07/20/05	06/13/05	15	86.8	09	+2.58E-05	
B-K-261	02RB-07-A	Bone	U236	-5.24E-06	+1.01E-05	Bq/g	07/19/05	06/13/05	15	97.2	01	+4.03E-05	

See Key for Form I.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
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RADIOANALYTICAL ANALYSES DATA PACKAGE

Lab Name: RTC  
Report No.: AmchitBatchF10

Case No: NA  
SDG No.: B-K-255

QC Sample ID	Sample Type	Anal Type	Sample Value	Sample Uncer +/-	Known Value	Known Uncer +/-	Units	LCS Recov	Anal Date	Chem Yield	Det ID	MDA	DQF
REAGENT	BLK	SR90	+2.59E-02	+1.56E-02	NA	NA	Bq/sp1e	NA%	07/26/2005	37.4%	B4	+6.29E-02	
REAGENT	BLK	U234	+3.02E-03	+1.20E-03	NA	NA	Bq/sp1	NA%	07/20/2005	34.2%	03	+1.29E-03	
REAGENT	BLK	U235	+1.90E-04	+3.02E-04	NA	NA	Bq/sp1	NA%	07/20/2005	34.2%	03	+1.36E-03	
REAGENT	BLK	U238	+2.73E-03	+1.23E-03	NA	NA	Bq/sp1	NA%	07/20/2005	34.2%	03	+1.92E-03	
REAGENT	BLK	PU238	+2.11E-05	+3.35E-05	NA	NA	Bq/sp1	NA%	07/18/2005	51.7%	16	+8.82E-04	
REAGENT	BLK	PU239/240	+3.10E-04	+4.59E-04	NA	NA	Bq/sp1	NA%	07/18/2005	51.7%	16	+7.84E-04	
REAGENT	BLK	AM241	+2.20E-04	+3.25E-04	NA	NA	Bq/sp1	NA%	07/20/2005	63.1%	13	+7.06E-04	
REAGENT	BLK	U236	+9.31E-05	+1.50E-04	NA	NA	Bq/sp1	NA%	07/20/2005	34.2%	03	+1.29E-03	
REAGENT	LCS	SR90	+7.09E+00	+3.26E-01	+7.10E+00	NA	Bq/mL	99.8%	07/26/2005	80.5%	A4	+7.25E-02	
REAGENT	LCS	U238	+1.99E-01	+2.92E-02	+1.99E-01	NA	Bq/mL	99.6%	07/18/2005	95.6%	08	+1.50E-03	
REAGENT	LCS	PU239/240	+1.60E-01	+1.90E-02	+1.50E-01	NA	Bq/mL	106.6%	07/19/2005	85.4%	08	+1.77E-03	
REAGENT	LCS	AM241	+1.58E-01	+1.43E-02	+1.55E-01	NA	Bq/mL	101.9%	07/20/2005	104.9%	08	+1.65E-03	

See Key for Form II.

Comments:

Project:       **Alpha and Sr-90 Analysis for Amchitka Island (Batch 10)**

Laboratory:   RTC

Report #:      AmchitBatchF10

SDG#:         B-K-255

## Summary of 2 and 3 sigma activities

Below are the results for Sr90, U234, U235, U236, U238, Pu238, Pu239/240, and Am241 for Batch 10 from the Amchitka Island Project that had a result/uncertainty ratio of 2 or more (uncertainty @ one sigma).

Customer ID	Lab ID	Isotope	Result	Uncertainty	Result/Unc
B-H-262	02RB-08-A	U234	1.20E-03	2.91E-04	4.1
B-H-262	02RB-08-A	U238	9.00E-04	2.59E-04	3.5
B-K-257	02RB-03-A	Sr90	1.81E-03	4.88E-04	3.7
B-K-260	02RB-06-A	U234	2.90E-04	1.30E-04	2.2
B-K-261	02RB-07-A	U238	2.57E-04	1.31E-04	2.0

All known sources of uncertainty are included in the uncertainty term. There may be unknown sources of uncertainty that are not accounted for. If the result/uncertainty ratio is more than 3, we have a degree of confidence that the result is positive (i.e. the result is statistically different than zero). A result with the result/uncertainty ratio between 2 and 3 is the first indication that an isotope may be present and further investigation may be warranted.

As with any good science no single data point is used in important decisions (results need to be reproducible).

ICPMS - Pu Determinations

Sample	Analysis Date and Time	115In				239Pu				240Pu				Pu239/Pu242				Pu240/Pu242				Pu239/Pu240				Alpha (Pu239+240)				Pu239/Alpha Pu240/Alpha																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS

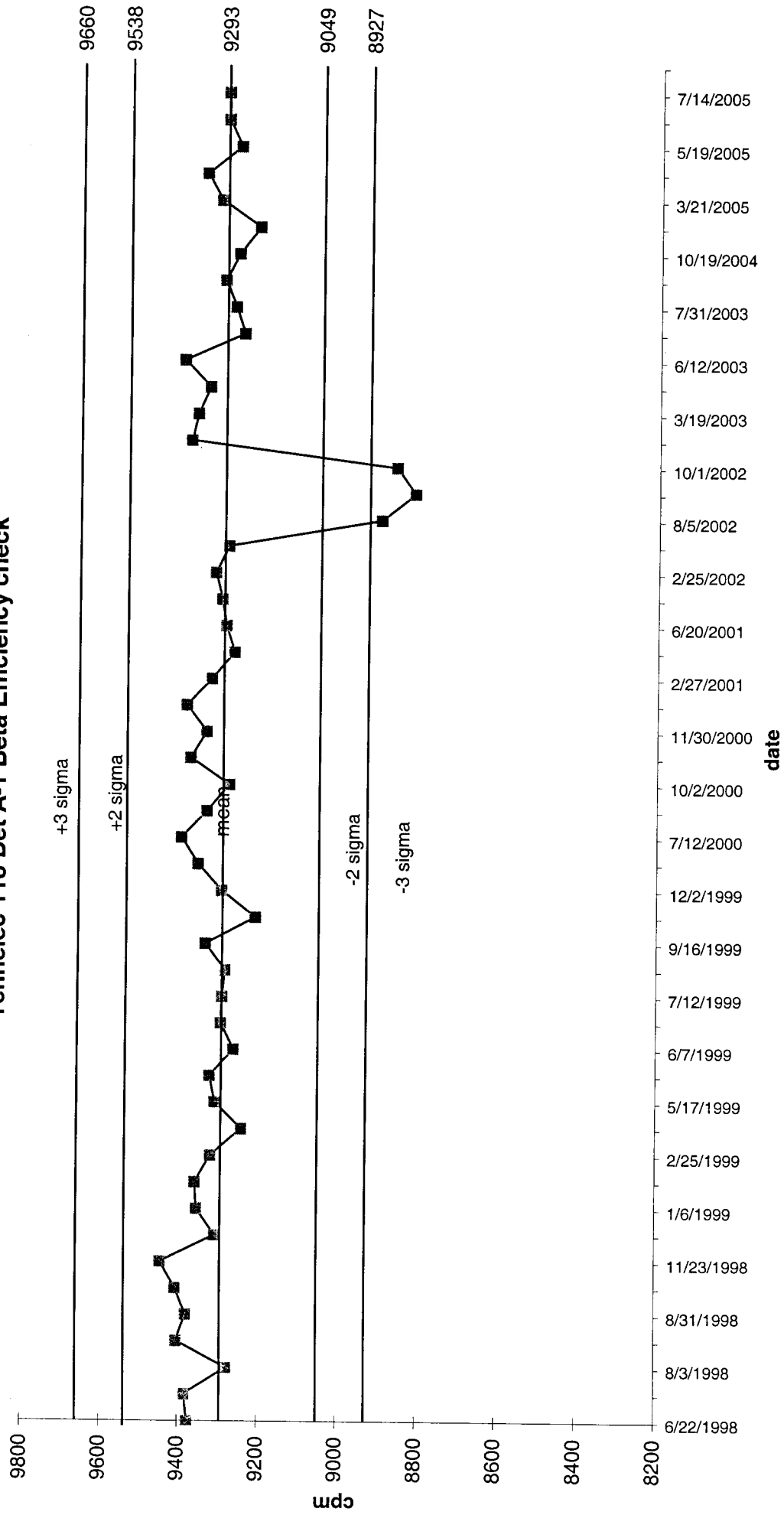
### ICPMS - Pu Determinations

Sample	Analysis Date and Time	115In			239Pu			240Pu			242Pu			Pu239/Pu242		Pu240/Pu242		Pu239/Pu240		Alpha (Pu239+240)		Activity Ratio	Pu239/Alpha Pu240/Alpha
		CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS Ratio	CPS Ratio	CPS Ratio	Bq/Sample	Bq/Sample	Bq/Sample	Bq/Sample			
K-CC-193-A	7/28/05 11:11 s	130.56	2.62	1.73	27.40	1.9	0.0002	0.0002	0.0002	1.9	1.98E-04	4.79E-04	3.18E-04										
K-CC-193-A	7/28/05 11:11 df	5	3	6	2.01	6				6	3												
K-CC-194-A	7/22/05 10:54 x	3133.53	4.53	11.61	4475.39	0.0010	0.0010	0.0010	0.0026	0.4	8.49E-04	7.96E-03	8.37E-04										
K-CC-194-A	7/22/05 10:54 s	132.91	2.85	3.69	264.51	0.0006	0.0006	0.0006	0.0008	0.3	5.38E-04	2.57E-03	3.66E-04										
K-CC-194-A	7/22/05 10:54 df	5	2	4	2	2				4	2												
K-CC-194-A	7/28/05 11:05 x	10517.41	8.70	2.02	16947.82	0.0005	0.0005	0.0005	0.0001	4.3	4.31E-04	3.66E-04	8.37E-04										
K-CC-194-A	7/28/05 11:05 s	99.04	2.48	2.06	213.99	0.0001	0.0001	0.0001	0.0001	4.6	1.23E-04	3.73E-04	3.66E-04										
K-CC-194-A	7/28/05 11:05 df	9	3	4	2.00	3				4	3												
K-CC-195-A	7/22/05 10:59 x	2029.03	9.53	20.44	4545.67	0.0021	0.0021	0.0045	0.0045	0.5	1.76E-03	1.38E-02	6.57E-04										
K-CC-195-A	7/22/05 10:59 s	116.95	4.70	5.89	174.24	0.0010	0.0010	0.0013	0.0013	0.3	8.70E-04	4.01E-03	3.06E-04										
K-CC-195-A	7/22/05 10:59 df	4	3	3	2	3				3	3												
K-CC-195-A	7/28/05 10:59 x	7422.48	6.20	2.69	17106.07	0.0004	0.0004	0.0002	0.0002	2.3	3.04E-04	4.83E-04	6.57E-04										
K-CC-195-A	7/28/05 10:59 s	469.03	3.51	2.74	999.94	0.0002	0.0002	0.0002	0.0002	2.7	1.73E-04	4.92E-04	3.06E-04										
K-CC-195-A	7/28/05 10:59 df	2	2	3	2.00	2				3	2												
K-CC-205-A	7/28/05 9:35 x	14405.30	103.45	3.86	1589.83	0.0659	0.0659	0.0025	0.0025	26.8	5.53E-02	7.54E-03	5.54E-02										100%
K-CC-205-A	7/28/05 9:35 s	198.36	6.35	2.65	93.93	0.0056	0.0056	0.0017	0.0017	18.7	4.74E-03	5.21E-03	6.16E-03										14%
K-CC-205-A	7/28/05 9:35 df	3	2	3	2.00	4				3	4												
K-CC-206-B	7/28/05 9:41 x	27635.79	109.87	2.69	1504.82	0.0730	0.0730	0.0018	0.0018	40.8	6.13E-02	5.49E-03	6.11E-02										100%
K-CC-206-B	7/28/05 9:41 s	35777.79	5.89	2.17	95.85	0.0081	0.0081	0.0014	0.0014	33.2	5.10E-03	4.43E-03	7.12E-03										14%
K-CC-206-B	7/28/05 9:41 df	2	2	3	2.00	4				3	4												
K-CC-217	7/28/05 10:12 x	3203.02	10.29	13.69	11028.08	0.0009	0.0009	0.0012	0.0012	0.8	7.83E-04	3.81E-03	6.44E-04										122%
K-CC-217	7/28/05 10:12 s	270.08	2.25	2.94	927.65	0.0002	0.0002	0.0003	0.0003	0.2	1.84E-04	8.78E-04	2.64E-04										57%
K-CC-217	7/28/05 10:12 df	2	4	2	2.00	5				3	5												
S-R-117-C	7/22/05 9:12 x	4581.41	0.94	-0.39	2789.88	0.0003	0.0003	-0.0001	-0.0001	-2.4	2.84E-04	-4.28E-04	7.52E-04										
S-R-117-C	7/22/05 9:12 s	210.70	3.01	3.46	61.07	0.0011	0.0011	0.0012	0.0012	22.9	9.06E-04	3.80E-03	3.76E-04										
S-R-117-C	7/22/05 9:12 df	3	3	3	3	3				3	3												
S-R-119-C	7/22/05 9:25 x	4869.98	-2.89	-2.72	3043.71	-0.0009	-0.0009	-0.0009	-0.0009	1.1	-7.97E-04	-2.74E-03	7.48E-04										
S-R-119-C	7/22/05 9:25 s	117.78	3.48	3.48	33.54	0.0011	0.0011	0.0011	0.0011	1.9	9.59E-04	3.51E-03	3.87E-04										
S-R-119-C	7/22/05 9:25 df	4	4	3	5	4				3	4												
Reagent Blank Batch 7	7/28/05 10:19 x	14036.23	0.95	-0.56	1438.81	0.0007	0.0007	-0.0004	-0.0004	-1.7	5.56E-04	-1.19E-03											
Reagent Blank Batch 7	7/28/05 10:19 s	438.65	2.02	1.58	25.16	0.0014	0.0014	0.0011	0.0011	6.0	1.18E-03	3.38E-03											
Reagent Blank Batch 7	7/28/05 10:19 df	2	7	8	2.01	7				8	7												
Reagent Blank Batch 3	7/22/05 9:32 x	4808.37	3.28	1.61	3066.63	0.0011	0.0011	0.0005	0.0005	2.0	8.97E-04	1.61E-03											
Reagent Blank Batch 3	7/22/05 9:32 s	109.60	3.62	4.13	42.93	0.0012	0.0012	0.0013	0.0013	5.7	9.90E-04	4.13E-03											
Reagent Blank Batch 3	7/22/05 9:32 df	3	4	4	4	4				4	4												
Reagent Blank Batch 3	7/28/05 7:41 x	1849.28	-1.13	-0.23	1750.78	-0.0006	-0.0006	-0.0001	-0.0001	5.0	-5.42E-04	-3.96E-04											
Reagent Blank Batch 3	7/28/05 7:41 s	91.58	2.23	1.86	57.87	0.0013	0.0013	0.0011	0.0011	42.2	1.07E-03	3.25E-03											
Reagent Blank Batch 3	7/28/05 7:41 df	9	4	5	2.00	4				5	4												
Reagent Blank Batch 4	7/22/05 9:51 x	14852.29	-1.56	-3.81	1417.47	-0.0011	-0.0011	-0.0027	-0.0027	0.4	-9.21E-04	-8.24E-03											
Reagent Blank Batch 4	7/22/05 9:51 s	272.49	3.04	3.62	40.99	0.0021	0.0021	0.0026	0.0026	0.9	1.80E-03	7.84E-03											
Reagent Blank Batch 4	7/22/05 9:51 df	3	4	3	3	4				3	4												
Reagent Blank Batch 4	7/28/05 8:12 x	1526.47	-1.80	-1.14	214.20	-0.0084	-0.0084	-0.0053	-0.0053	1.6	-7.04E-03	-1.64E-02											
Reagent Blank Batch 4	7/28/05 8:12 s	303.07	2.06	1.45	11.41	0.0096	0.0096	0.0068	0.0068	2.7	8.06E-03	2.08E-02											
Reagent Blank Batch 4	7/28/05 8:12 df	2	8	6	2.03	8				6	8												
Reagent Blank Batch 5	7/22/05 10:10 x	8375.34	-1.72	2.19	11031.98	-0.0002	-0.0002	-0.0002	-0.0002	-0.8	-1.31E-04	6.10E-04											
Reagent Blank Batch 5	7/22/05 10:10 s	309.89	2.94	3.50	210.88	0.0003	0.0003	0.0003	0.0003	1.8	2.24E-04	9.72E-04											
Reagent Blank Batch 5	7/22/05 10:10 df	3	3	3	2	3				3	3												
Reagent Blank Batch 5	7/28/05 11:22 x	7414.13	4.04	3.02	12479.28	0.0003	0.0003	0.0002	0.0002	1.3	2.71E-04	7.43E-04											
Reagent Blank Batch 5	7/28/05 11:22 s	242.49	3.13	2.11	664.88	0.0003	0.0003	0.0002	0.0002	1.4	2.11E-04	5.20E-04											
Reagent Blank Batch 5	7/28/05 11:22 df	3	2	3	2.00	2				3	2												
Reagent Blank Batch 8a	7/22/05 10:34 x	2633.54	-8.31	-6.31	127.61	-0.0651	-0.0651	-0.0494	-0.0494	1.3	-5.46E-02	-1.52E-01											

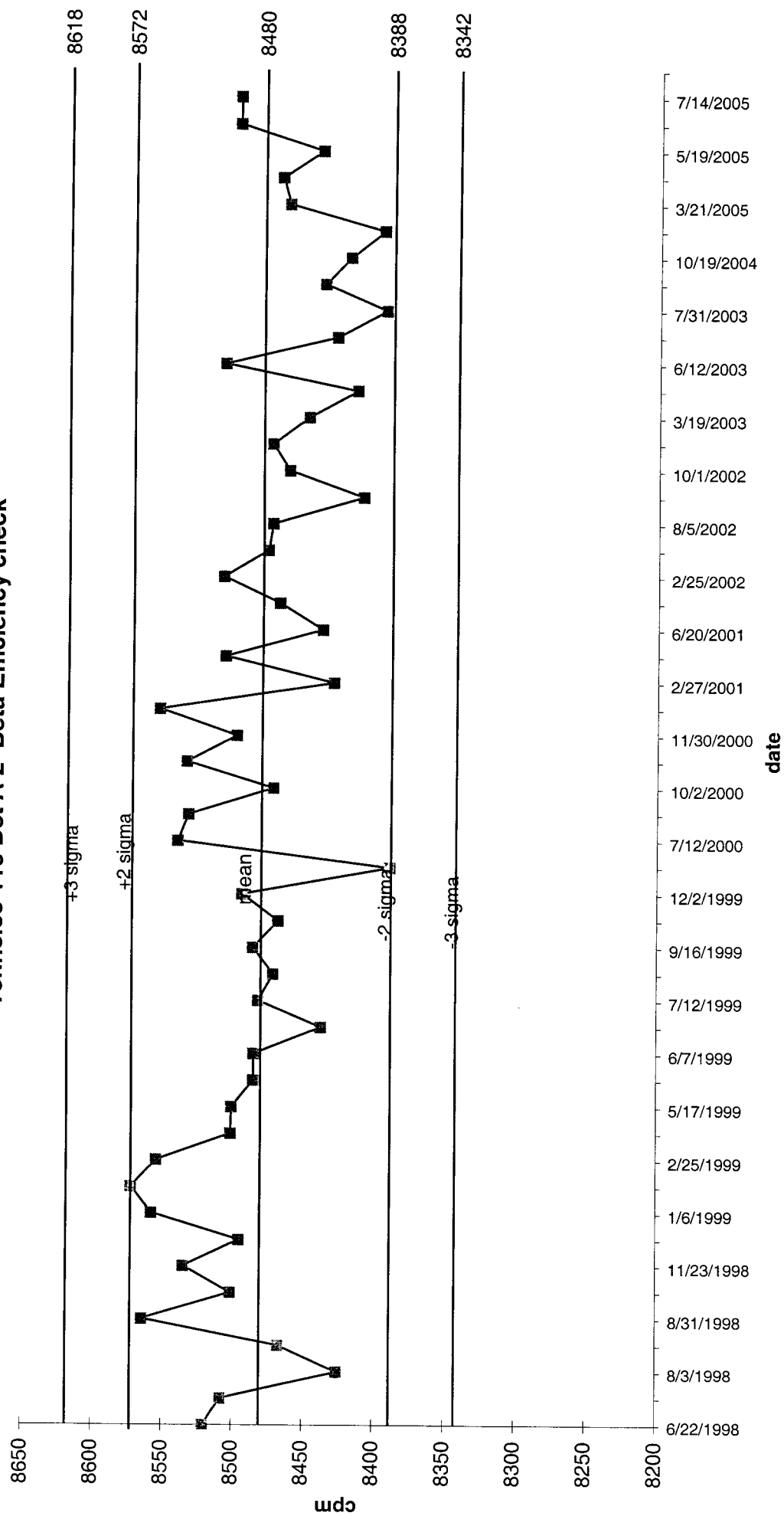
ICPMS - Pu Determinations

Sample	Analysis Date and Time	115In			239Pu			240Pu			Pu239/Pu242			Pu240/Pu242			Pu239/Pu240			Alpha (Pu239+240)			Pu239/Alpha Pu240/Alpha		
		CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	CPS	Bq/Sample	Bq/Sample	Bq/Sample	Bq/Sample	Activity Ratio	Activity Ratio
Reagent Blank Batch 8a	7/22/05 10:34 s	704.13	2.97	3.50	11.98									0.0241	0.0278	0.9	0.9	0.9	2.02E-02	8.52E-02					
Reagent Blank Batch 8a	7/22/05 10:34 df	2	3	3	6									4	3				4	3					
Reagent Blank Batch 8a	7/28/05 8:39 x	1412.53	-1.63	-0.98	81.53									-0.0200	-0.0120	1.7	1.7	1.7	-1.68E-02	-3.67E-02					
Reagent Blank Batch 8a	7/28/05 8:39 s	186.71	2.04	1.66	4.73									0.0250	0.0204	3.5	3.5	3.5	2.10E-02	6.25E-02					
Reagent Blank Batch 8a	7/28/05 8:39 df	3	8	7	2.20									8	7				8	7					
Reagent Blank Batch 8a rpt	7/28/05 9:19 x	13643.04	-0.30	-0.73	515.46									-0.0006	-0.0014	0.4	0.4	0.4	-4.85E-04	-4.32E-03					
Reagent Blank Batch 8a rpt	7/28/05 9:19 s	391.84	2.14	1.46	29.07									0.0042	0.0028	3.1	3.1	3.1	3.49E-03	8.69E-03					
Reagent Blank Batch 8a rpt	7/28/05 9:19 df	2	6	6	2.00									6	6				6	6					
Reagent Blank Batch 8b	7/28/05 10:39 x	12975.91	-0.13	0.61	349.45									-0.0004	0.0017	-0.2	-0.2	-0.2	-3.15E-04	5.33E-03					
Reagent Blank Batch 8b	7/28/05 10:39 s	865.45	2.17	2.10	14.52									0.0062	0.0060	3.7	3.7	3.7	5.22E-03	1.85E-02					
Reagent Blank Batch 8b	7/28/05 10:39 df	2	5	3	2.02									5	3				5	3					
Reagent Control Batch 3	7/22/05 9:38 x	15256.89	-4.06	22.28	962.25									-0.0042	0.0232	-0.2	-0.2	-0.2	-3.54E-03	7.10E-02					
Reagent Control Batch 3	7/22/05 9:38 s	692.62	2.94	3.37	19.05									0.0031	0.0035	0.1	0.1	0.1	2.56E-03	1.08E-02					
Reagent Control Batch 3	7/22/05 9:38 df	2	3	2	7									3	2				3	2					
Reagent Control Batch 3	7/28/05 7:47 x	11241.88	-0.38	14.36	472.88									-0.0008	0.0304	0.0	0.0	0.0	-6.76E-04	9.31E-02					
Reagent Control Batch 3	7/28/05 7:47 s	212.77	2.10	2.27	22.94									0.0044	0.0050	0.1	0.1	0.1	3.73E-03	1.54E-02					
Reagent Control Batch 3	7/28/05 7:47 df	3	7	3	2.01									7	4				7	4					
Reagent Control Batch 4	7/22/05 9:56 x	9847.08	3.28	279.12	10611.65									0.0003	0.0263	0.0	0.0	0.0	2.59E-04	8.07E-02					
Reagent Control Batch 4	7/22/05 9:56 s	140.59	4.38	17.83	95.82									0.0004	0.0017	0.0	0.0	0.0	3.46E-04	5.20E-03					
Reagent Control Batch 4	7/22/05 9:56 df	5	3	2	2									3	2				3	2					
Reagent Control Batch 4	7/28/05 8:18 x	932.13	2.54	91.19	3446.56									0.0007	0.0265	0.0	0.0	0.0	6.17E-04	8.12E-02					
Reagent Control Batch 4	7/28/05 8:18 s	320.71	2.32	20.01	1021.94									0.0007	0.0098	0.0	0.0	0.0	5.94E-04	2.99E-02					
Reagent Control Batch 4	7/28/05 8:18 df	2	4	2	2.00									4	4				4	4					
Reagent Control Batch 4 rpt	7/28/05 8:28 x	309.49	1.95	38.36	1367.64									0.0014	0.0280	0.1	0.1	0.1	1.20E-03	8.60E-02					
Reagent Control Batch 4 rpt	7/28/05 8:28 s	116.11	2.64	9.79	367.15									0.0020	0.0104	0.1	0.1	0.1	1.65E-03	3.19E-02					
Reagent Control Batch 4 rpt 2	7/28/05 8:28 df	7	3	2	2.00									3	4				3	4					
Reagent Control Batch 4 rpt 2	7/28/05 9:12 x	3181.01	0.04	143.36	5522.63									0.0000	0.0260	0.0	0.0	0.0	5.43E-06	7.96E-02					
Reagent Control Batch 4 rpt 2	7/28/05 9:12 s	85.65	2.02	1.45	1.70									0.0004	0.0003	0.0	0.0	0.0	3.07E-04	8.07E-04					
Reagent Control Batch 4 rpt 2	7/29/05 9:12 df	Estimated												2	2				2	2					
Reagent Control Batch 5	7/22/05 10:21 x	1630.29	1.53	157.03	4401.68									0.0003	0.0357	0.0	0.0	0.0	2.91E-04	1.09E-01					
Reagent Control Batch 5	7/22/05 10:21 s	577.04	3.01	10.92	170.15									0.0007	0.0028	0.0	0.0	0.0	5.75E-04	8.71E-03					
Reagent Control Batch 5	7/22/05 10:21 df	2	3	2	2									3	3				3	3					
Reagent Control Batch 5	7/28/05 11:16 x	7334.15	2.04	458.95	17452.94									0.0001	0.0263	0.0	0.0	0.0	9.79E-05	8.07E-02					
Reagent Control Batch 5	7/28/05 11:16 s	164.11	2.21	8.93	134.83									0.0001	0.0006	0.0	0.0	0.0	1.06E-04	1.69E-03					
Reagent Control Batch 5	7/28/05 11:16 df	4	4	2	2.00									4	3				4	3					
Reagent Control Batch 7	7/28/05 10:26 x	4000.11	2.20	347.95	13292.53									0.0002	0.0262	0.0	0.0	0.0	1.39E-04	8.03E-02					
Reagent Control Batch 7	7/28/05 10:26 s	696.08	2.02	40.98	1769.43									0.0002	0.0047	0.0	0.0	0.0	1.29E-04	1.43E-02					
Reagent Control Batch 7	7/28/05 10:26 df	2	7	2	2.00									7	4				7	4					
Reagent Control Batch 8a	7/22/05 10:40 x	2806.33	-3.39	10.61	375.12									-0.0090	0.0283	-0.3	-0.3	-0.3	-7.58E-03	8.68E-02					
Reagent Control Batch 8a	7/22/05 10:40 s	146.47	2.89	3.95	15.93									0.0077	0.0106	0.3	0.3	0.3	6.47E-03	3.25E-02					
Reagent Control Batch 8a	7/22/05 10:40 df	5	2	4	7									2	4				2	4					
Reagent Control Batch 8a	7/28/05 8:44 x	1078.40	-1.05	4.44	171.95									-0.0061	0.0258	-0.2	-0.2	-0.2	-5.11E-03	7.92E-02					
Reagent Control Batch 8a	7/28/05 8:44 s	175.49	2.06	1.56	32.58									0.0120	0.0103	0.5	0.5	0.5	1.01E-02	3.17E-02					
Reagent Control Batch 8a	7/28/05 8:44 df	3	8	8	2.00									8	10				8	10					
Reagent Control Batch 8a rpt	7/28/05 9:26 x	9806.36	0.54	38.36	1296.71									0.0004	0.0296	0.0	0.0	0.0	3.47E-04	9.08E-02					
Reagent Control Batch 8a rpt	7/28/05 9:26 s	162.34	2.07	3.83	42.22									0.0016	0.0031	0.1	0.1	0.1	1.34E-03	9.53E-03					
Reagent Control Batch 8a rpt	7/28/05 9:26 df	4	8	2	2.00									8	3				8	3					
Reagent Control Batch 8b	7/28/05 10:45 x	12910.64	1.70	21.61	855.15									0.0020	0.0253	0.1	0.1	0.1	1.67E-03	7.75E-02					
Reagent Control Batch 8b	7/28/05 10:45 s	769.98	2.23	1.60	7.19									0.0026	0.0019	0.1	0.1	0.1	2.19E-03	5.76E-03					
Reagent Control Batch 8b	7/28/05 10:45 df	2	4	8	2.08									4	8				4	8					

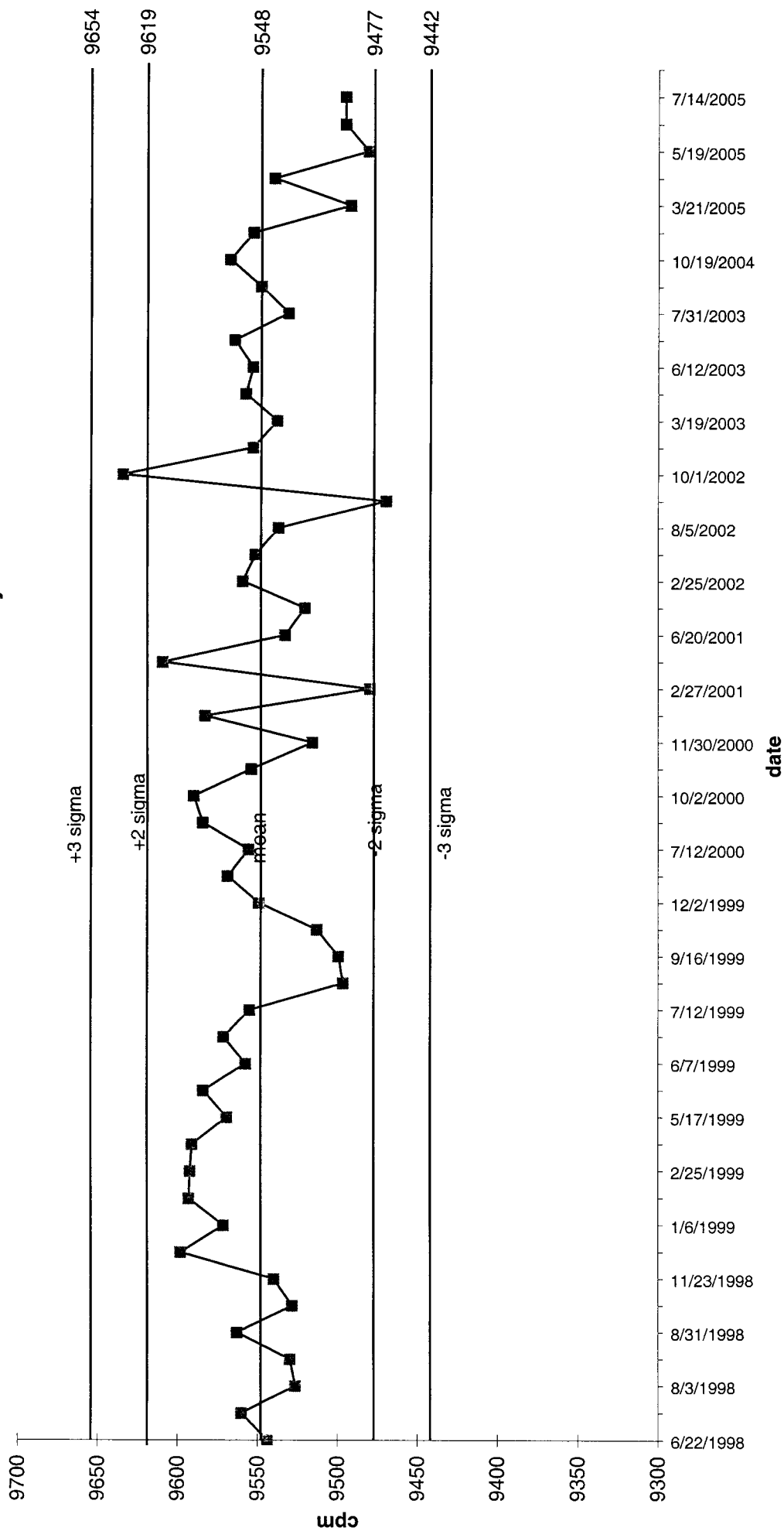
# Tennelec 118 Det A-1 Beta Efficiency check



# Tennelec 118 Det A-2 Beta Efficiency check

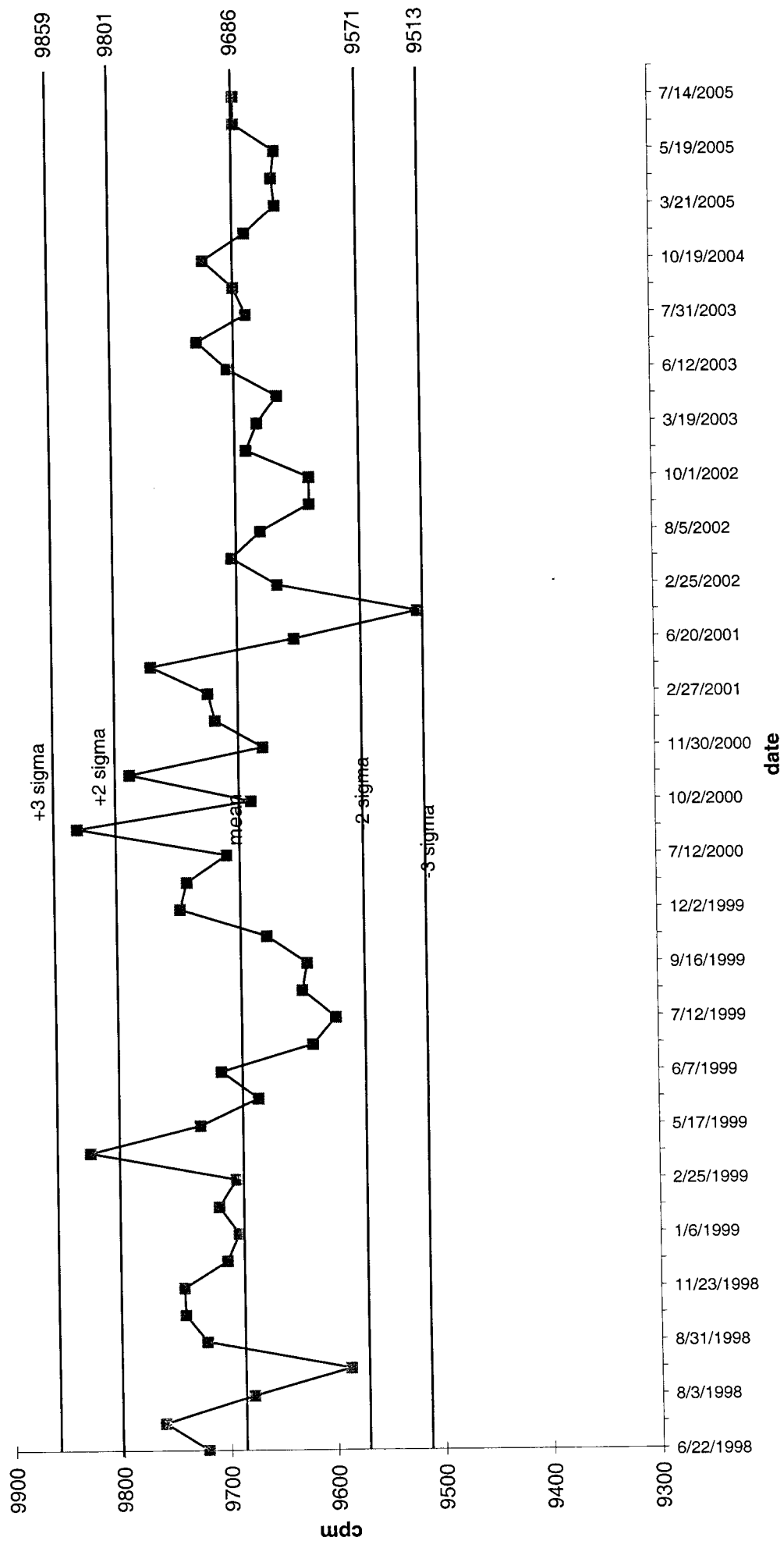


# Tennelec 118 Det A-3 Beta Efficiency check

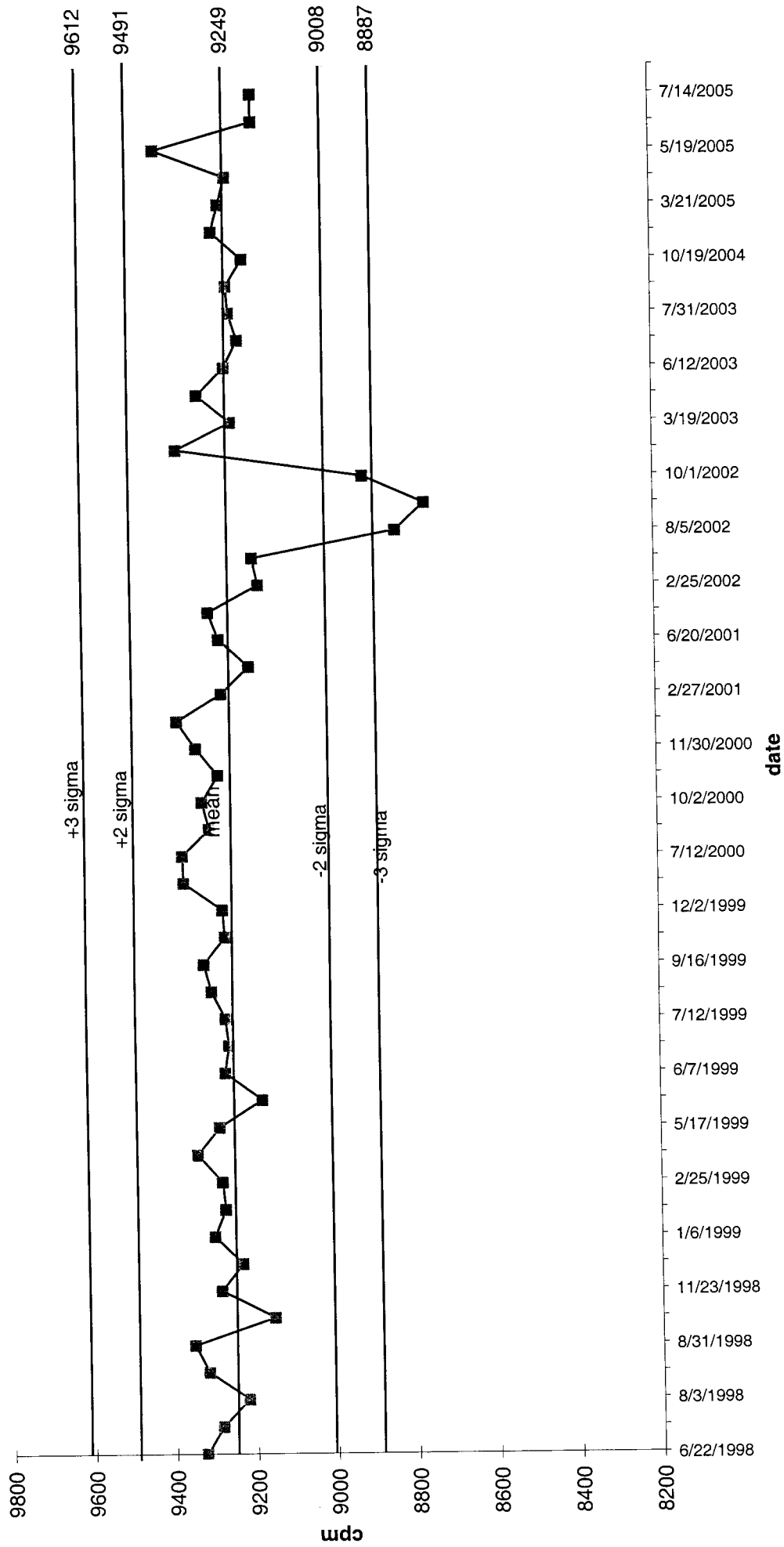




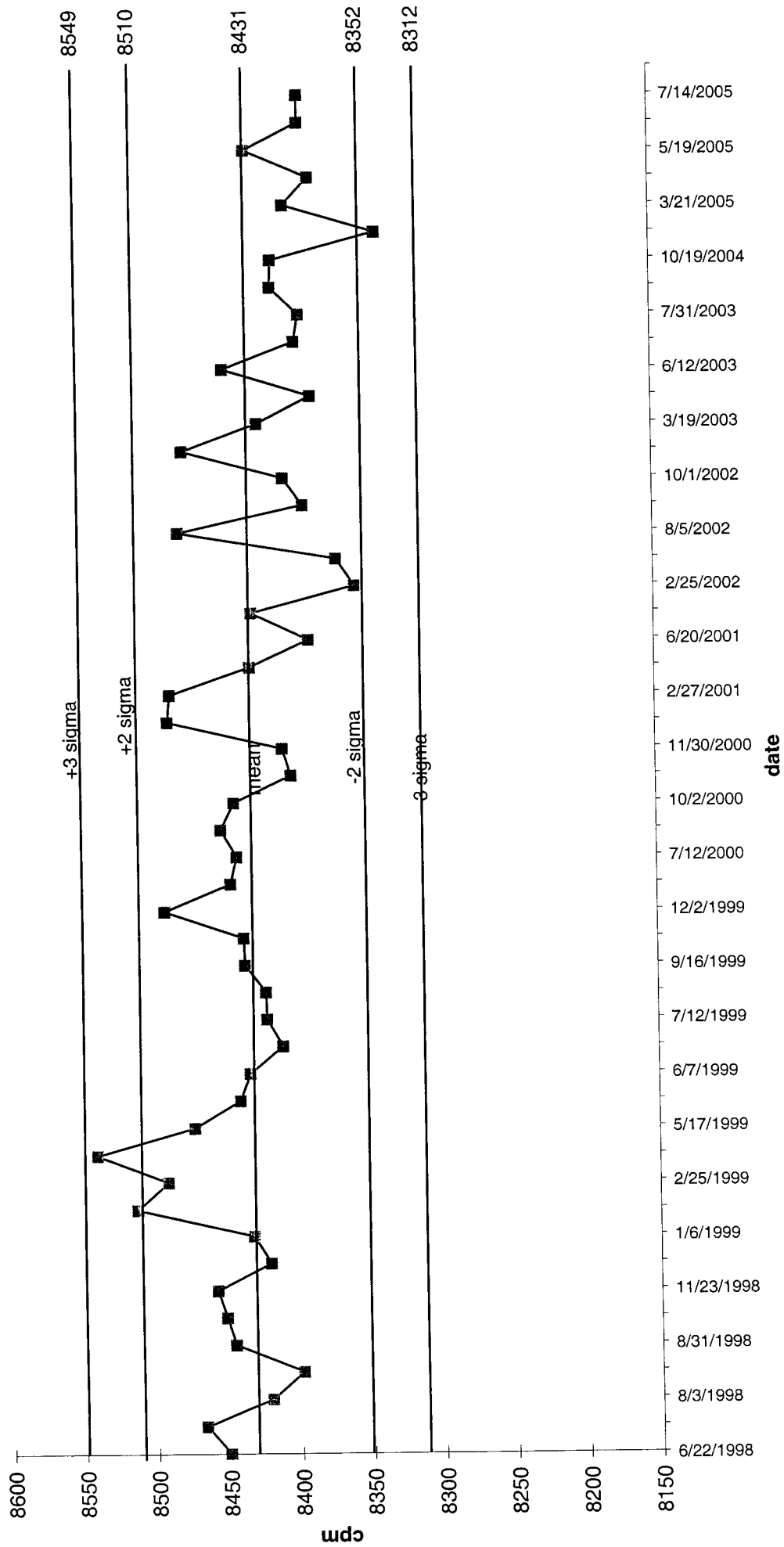
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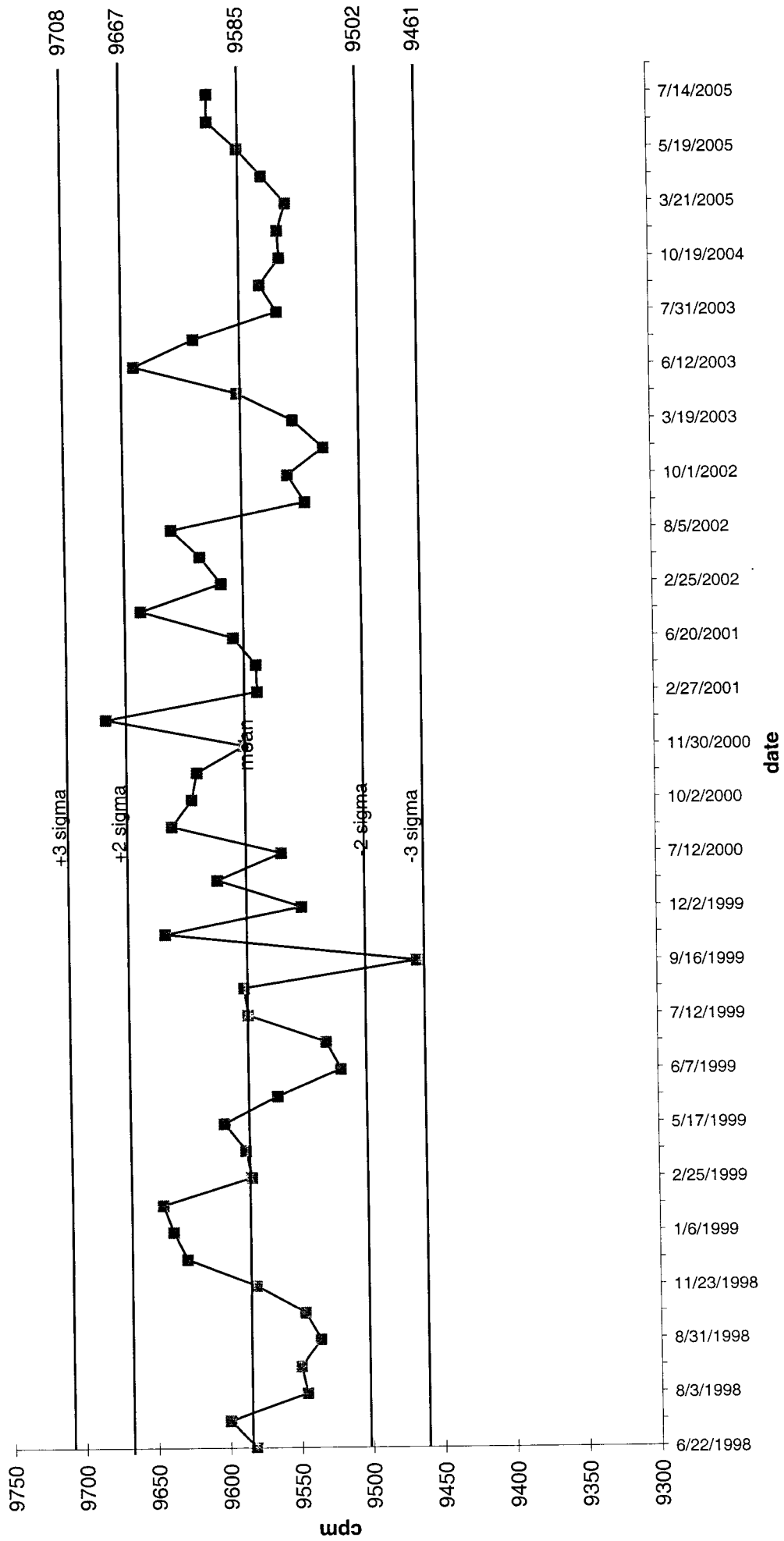
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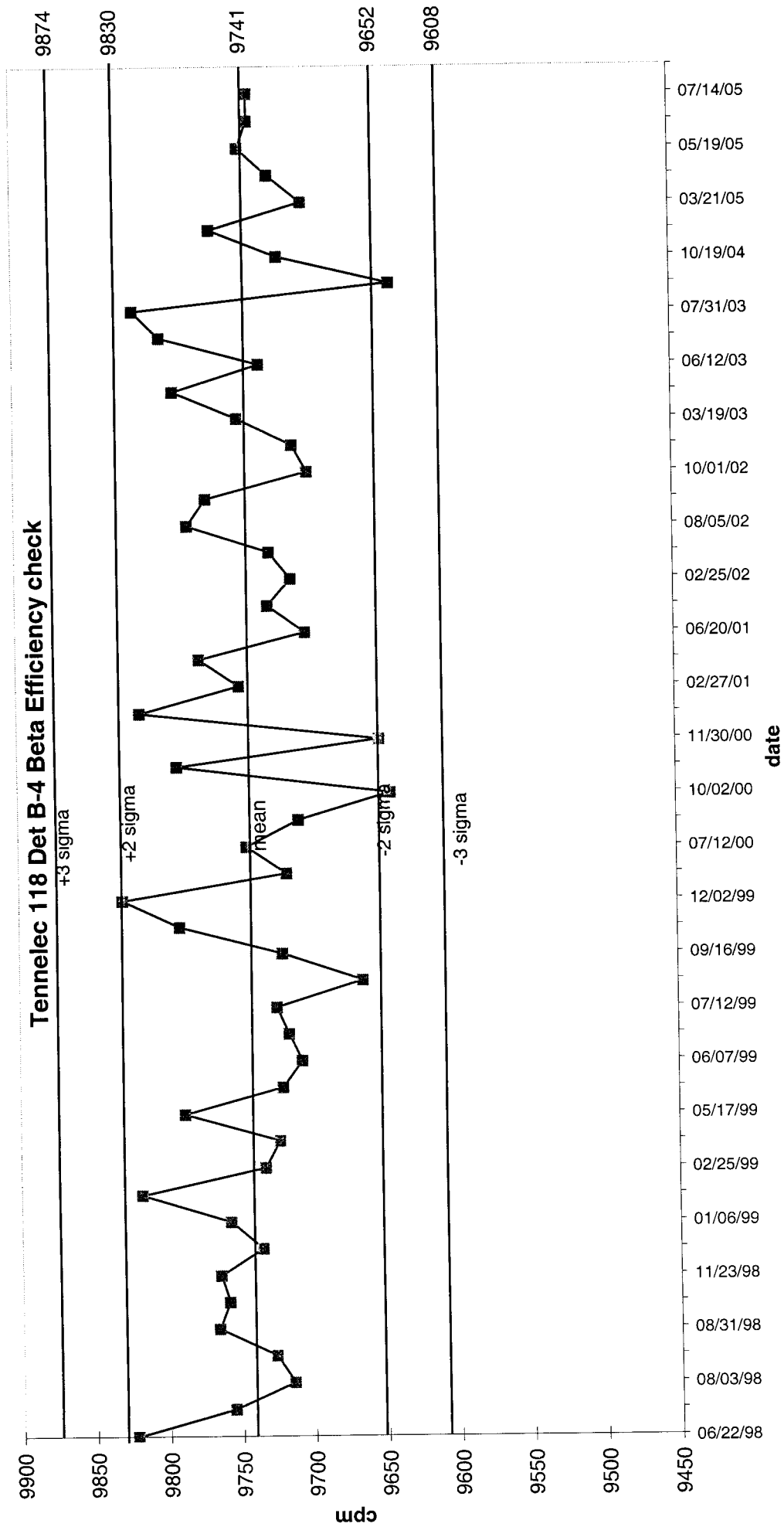


# Tennelec 118 Det B-2 Beta Efficiency check

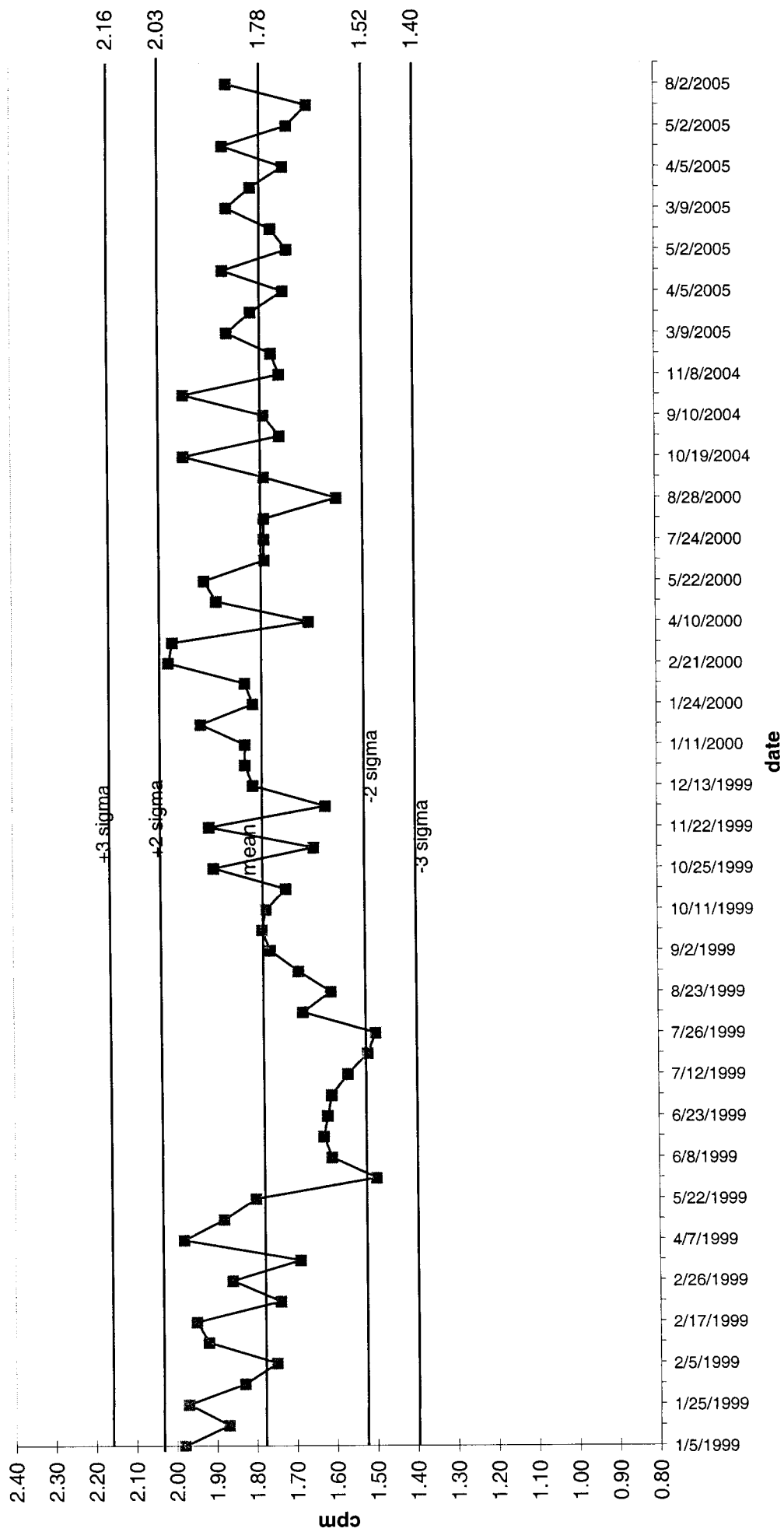


# Tennelec 118 Det B-3 Beta Efficiency check

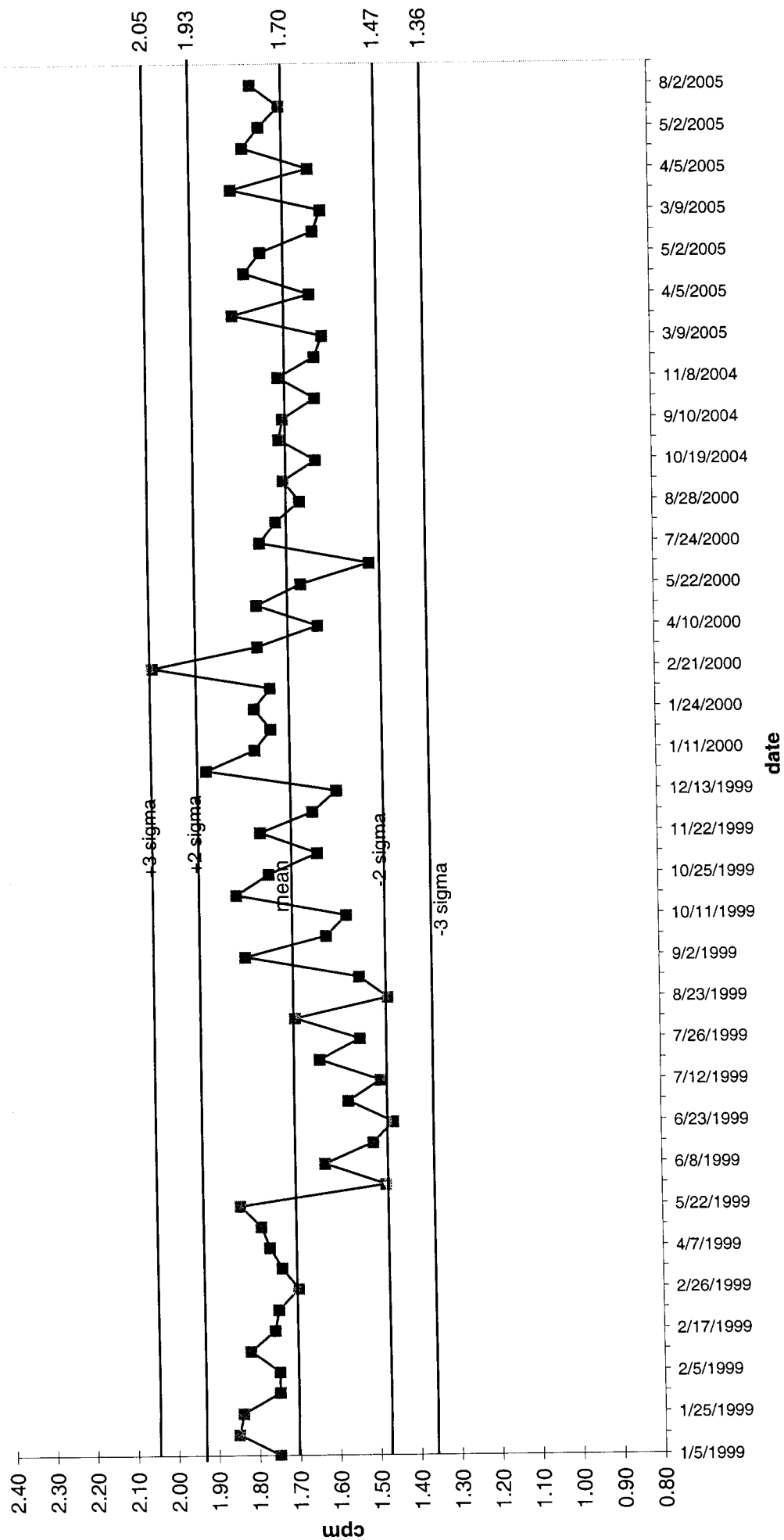




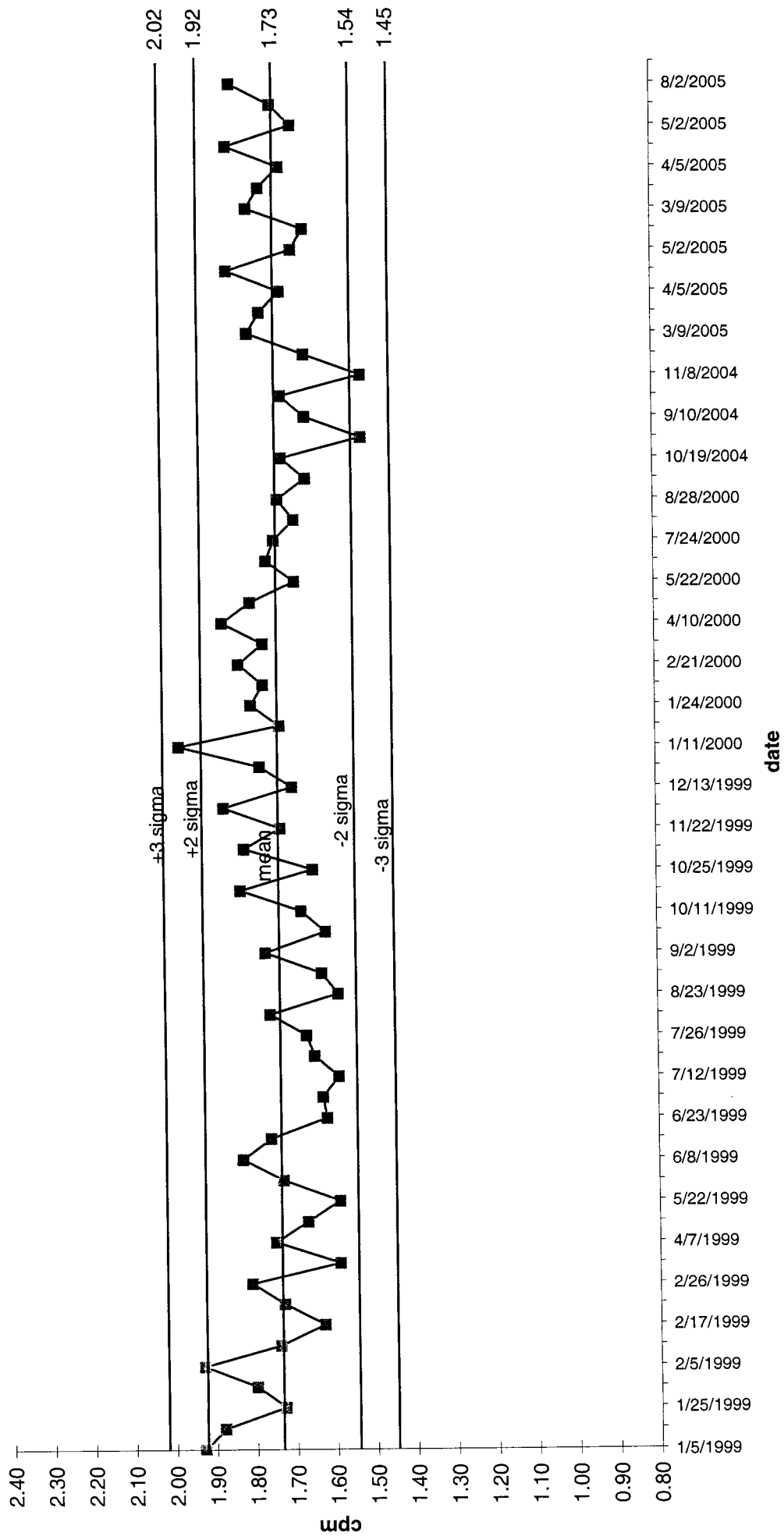
# Tennelec 118 Det A-1 Beta Background



# Tennelec 118 Det A-2 Beta Background

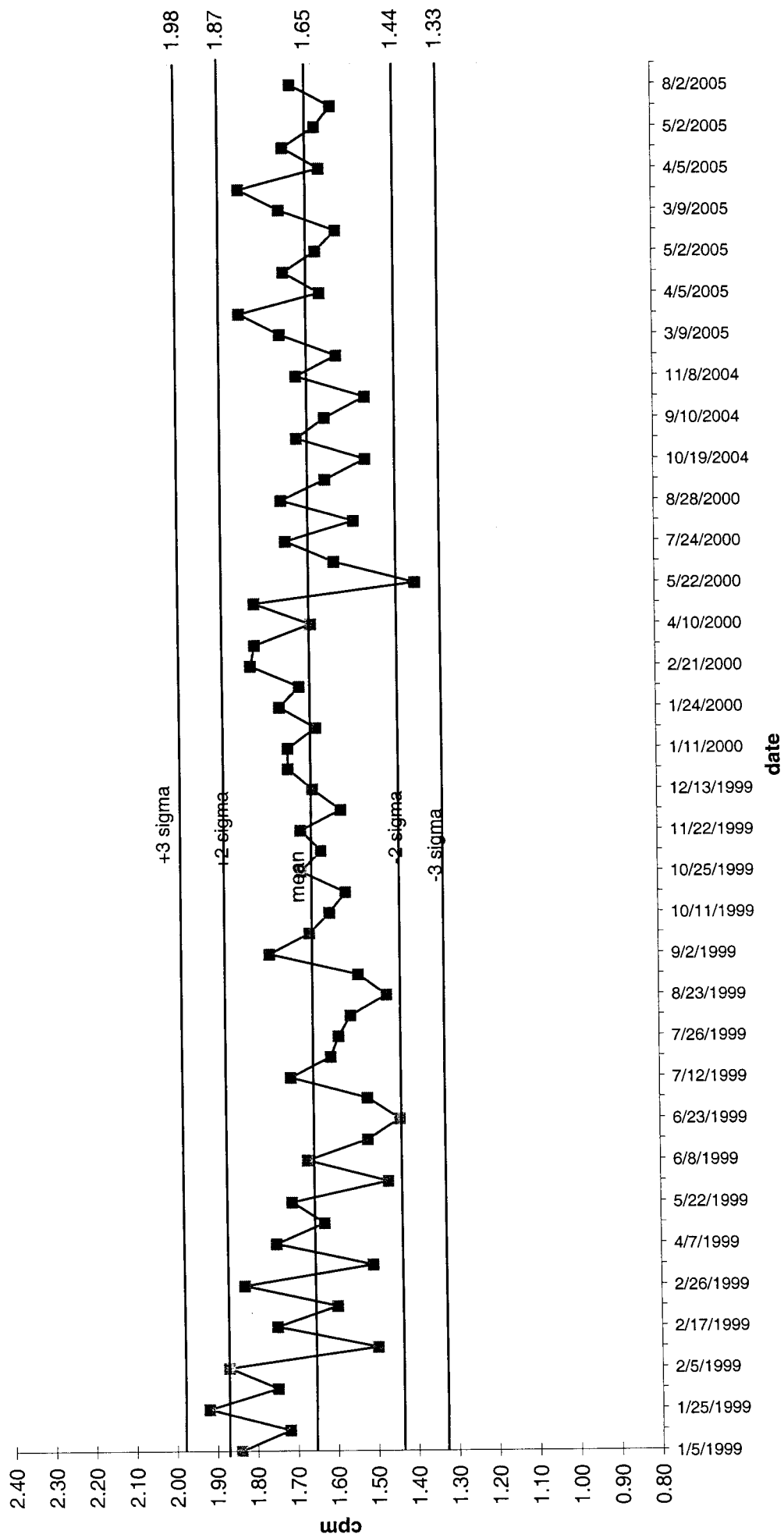


# Tennelec 118 Det A-3 Beta Background

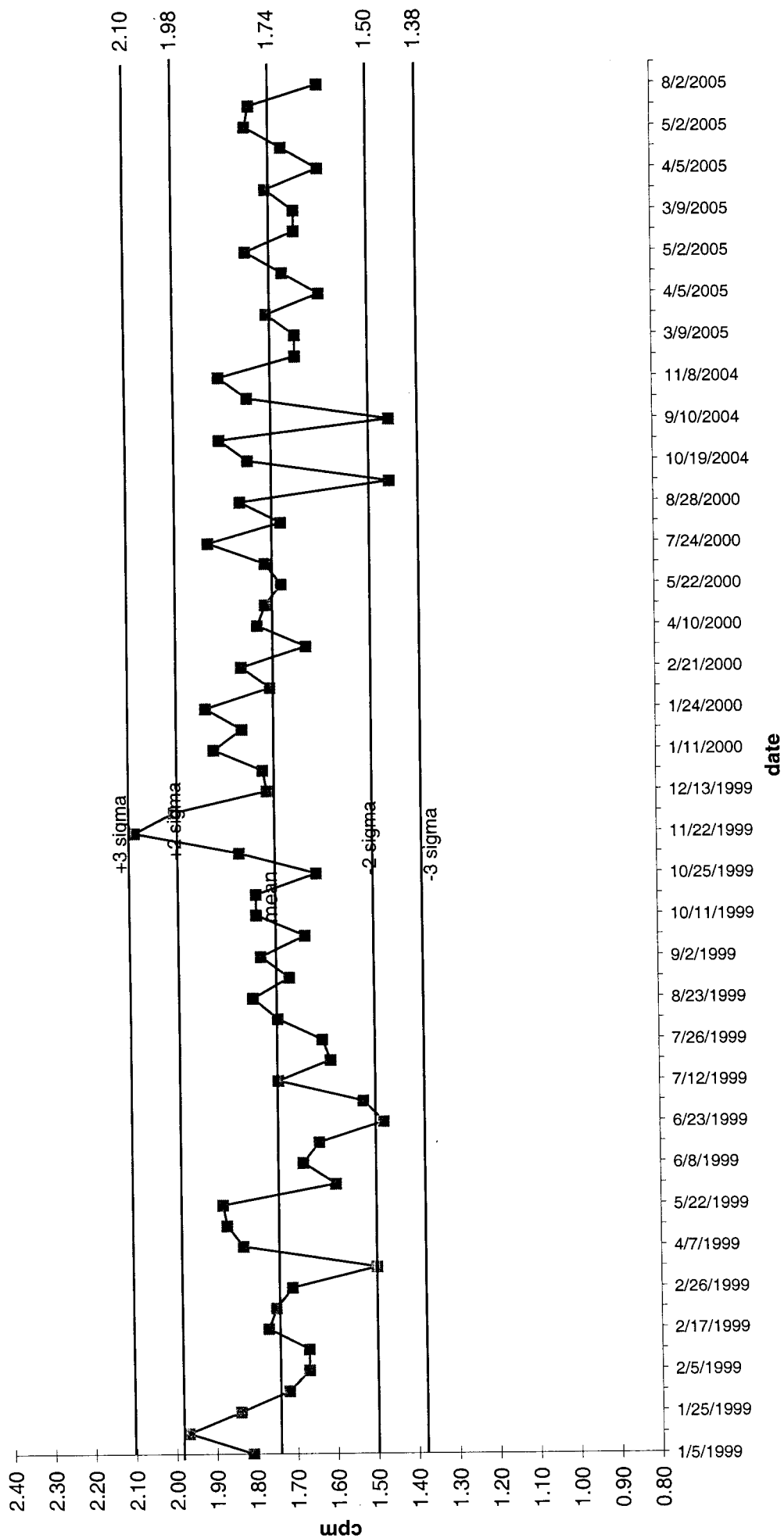




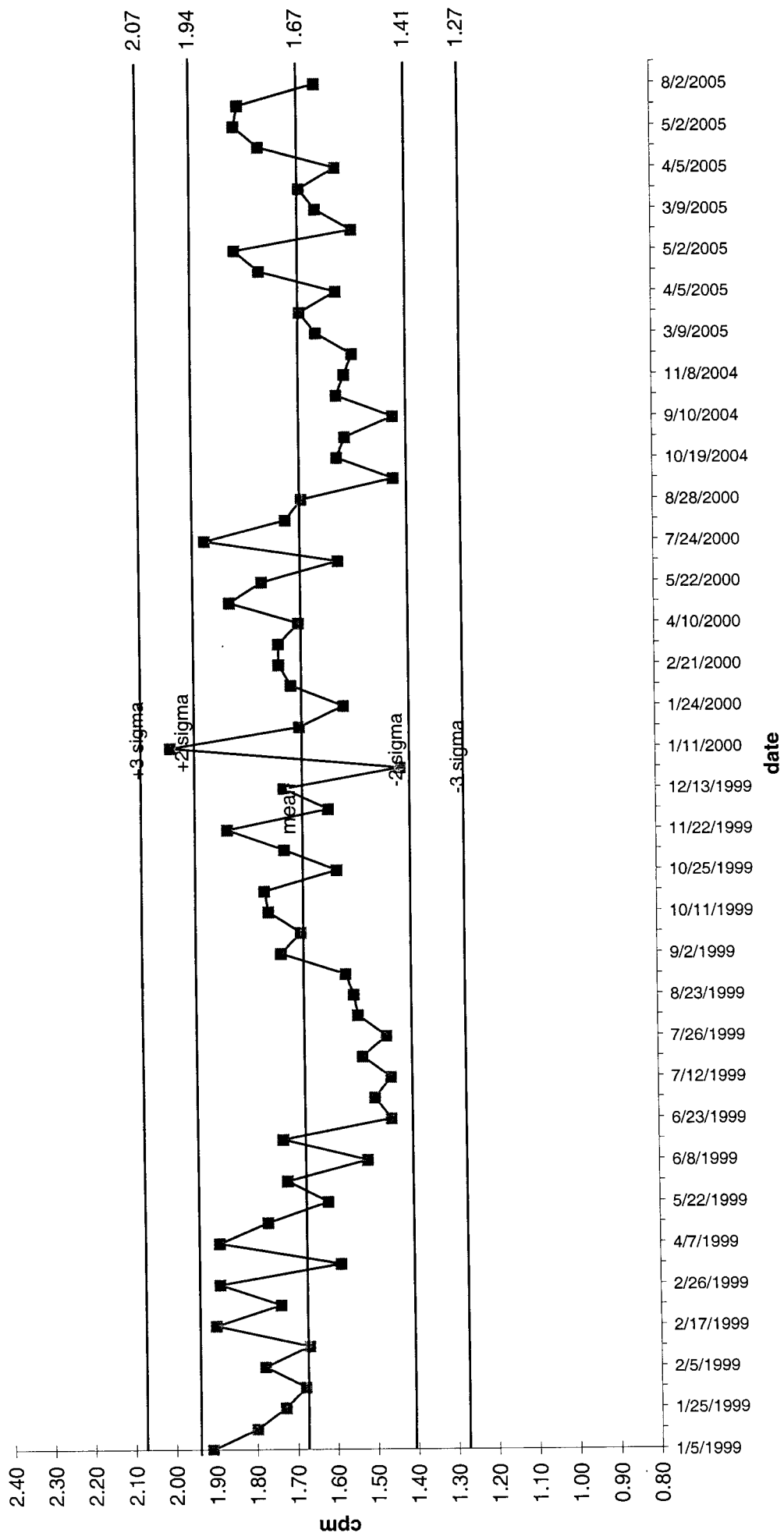
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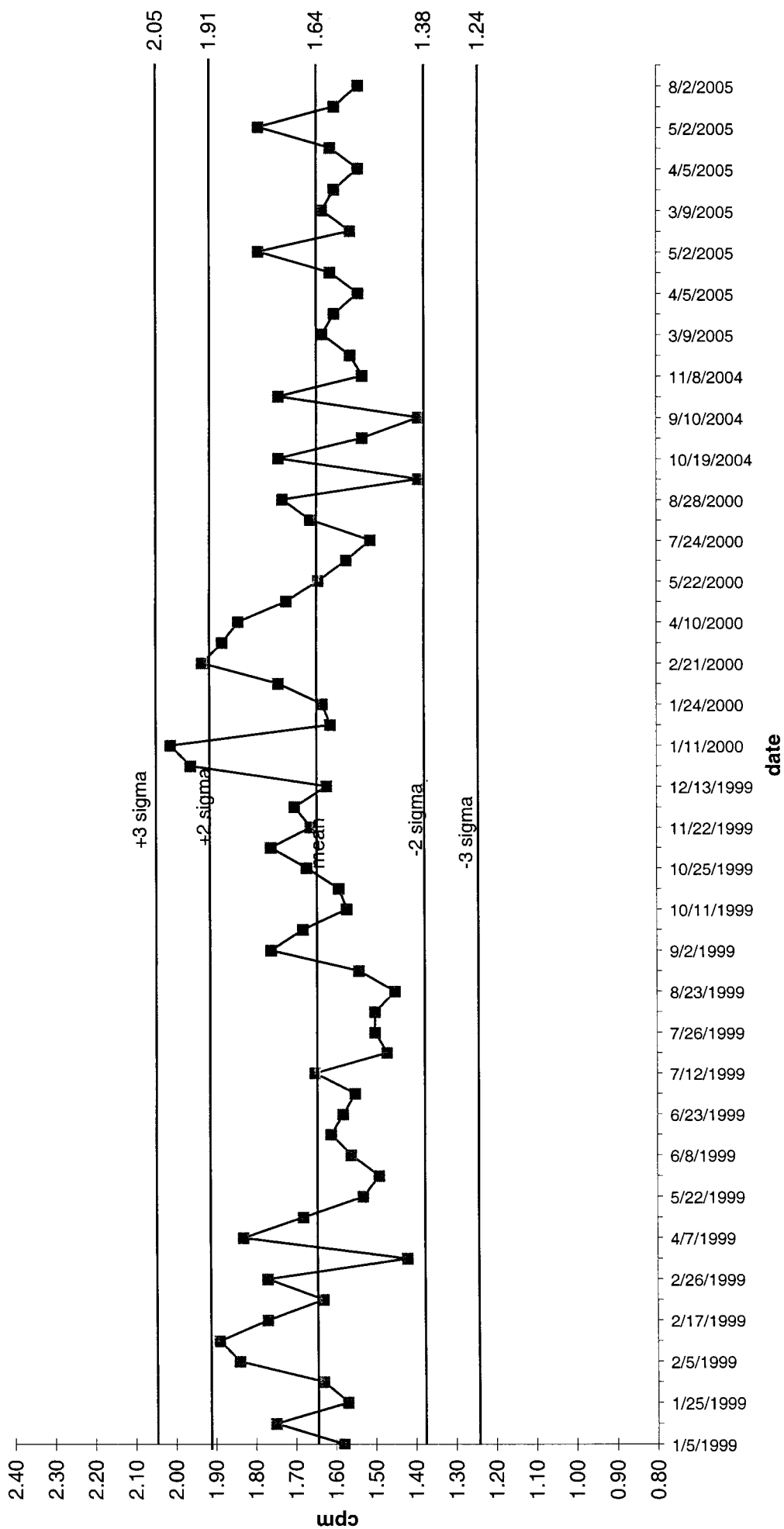
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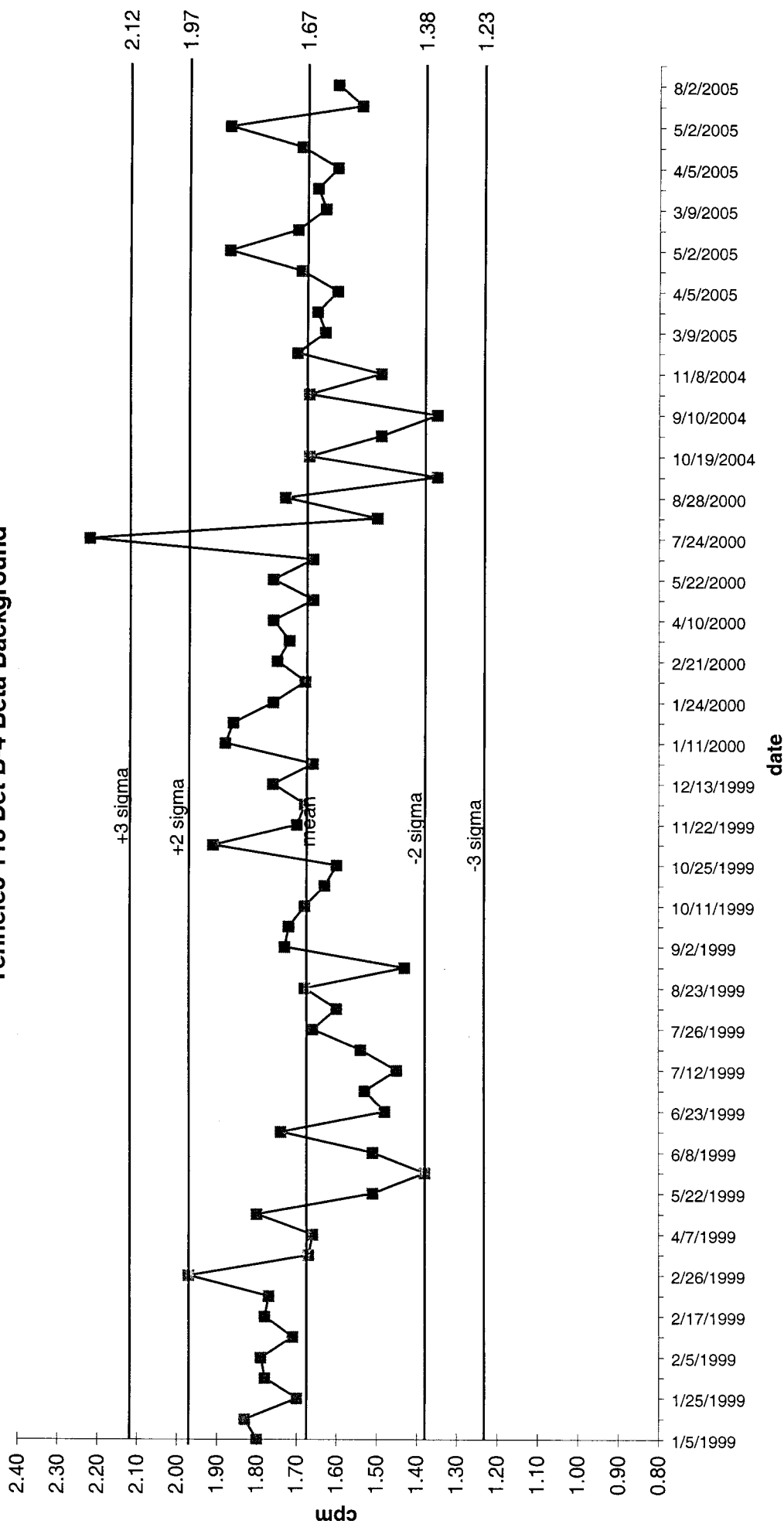
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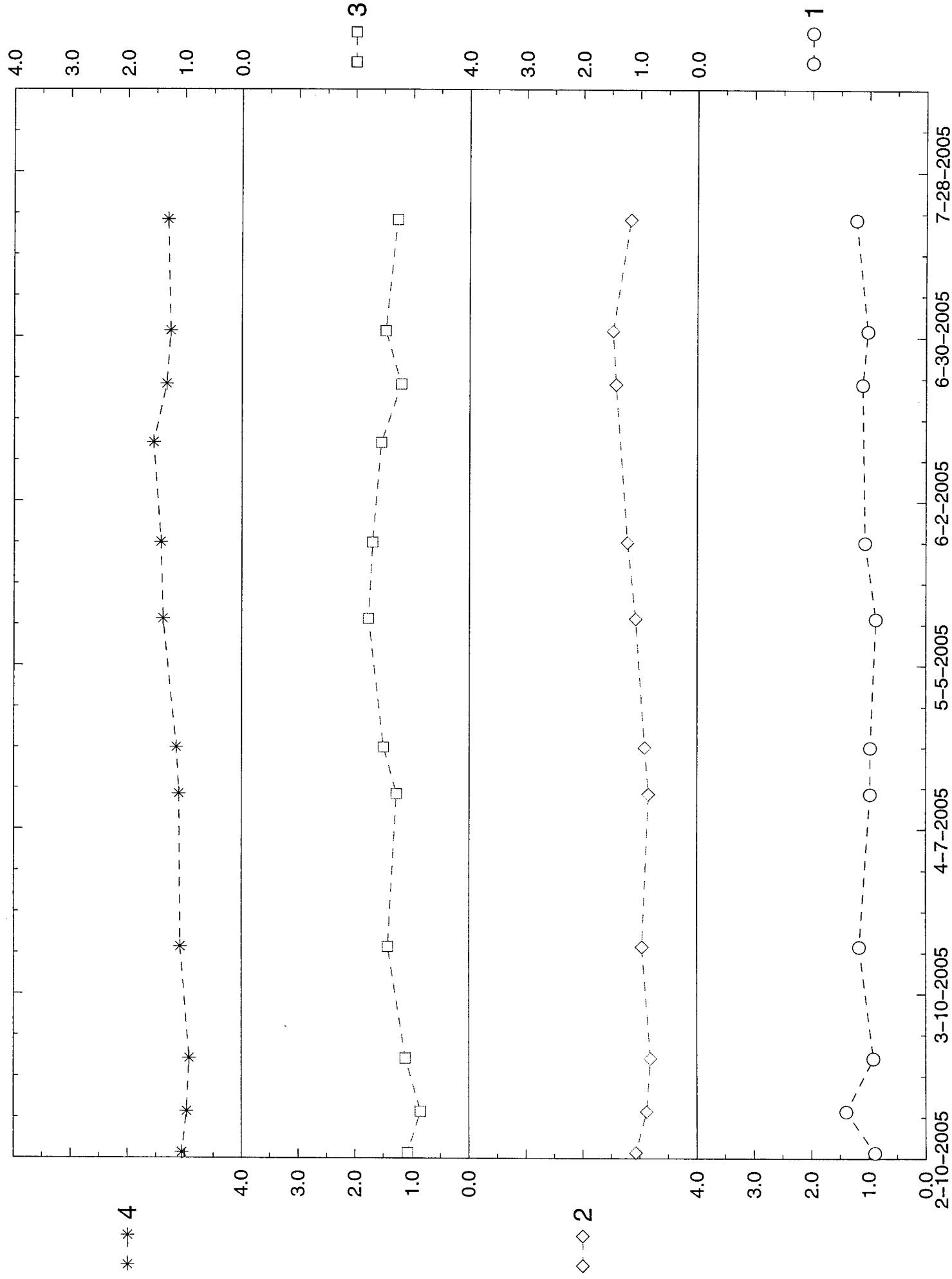
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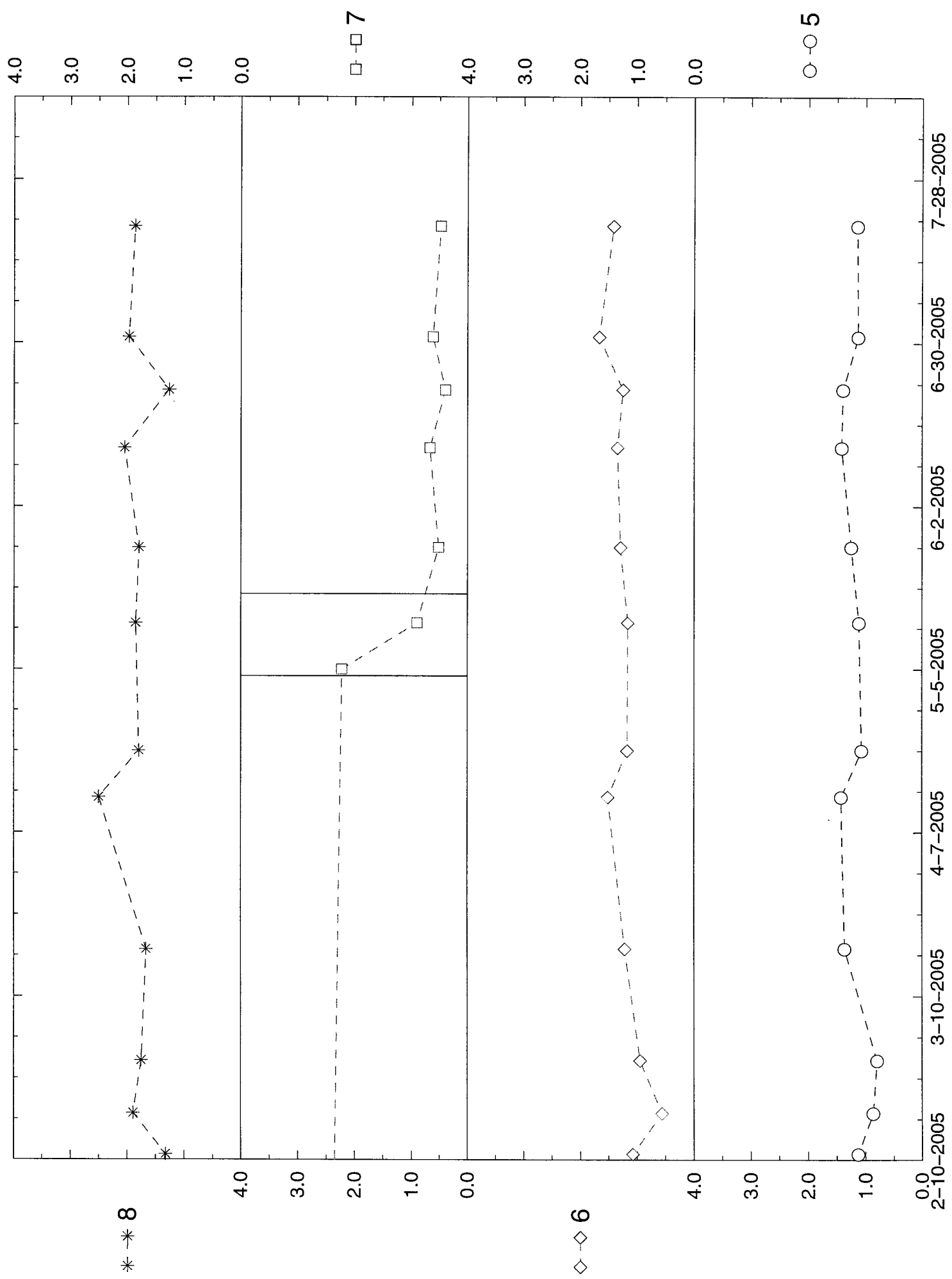
# Tennelec 118 Det B-4 Beta Background



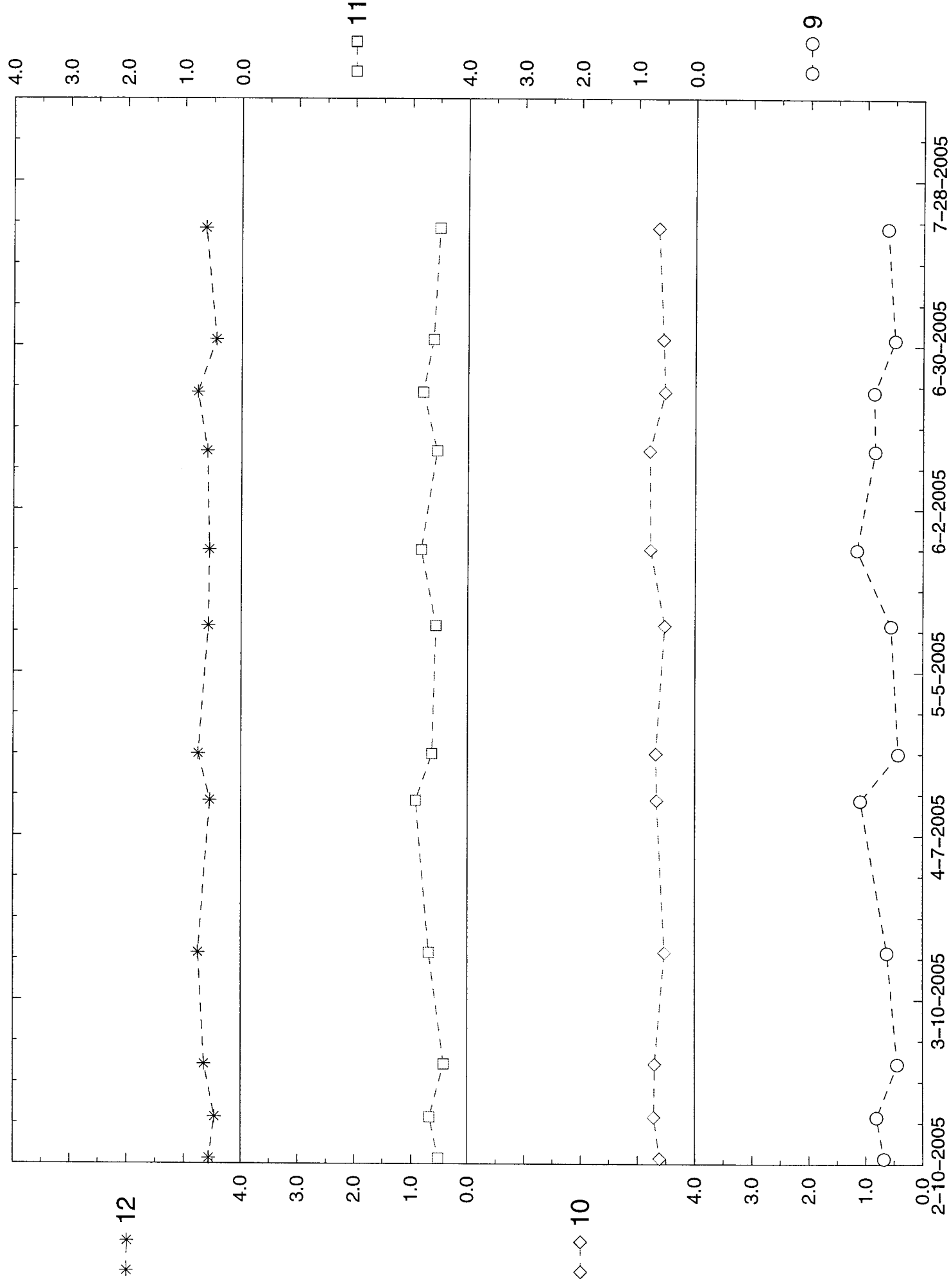
naboo  $\alpha$  Detector Background Rates: Counts per Hour



naboo  $\alpha$  Detector Background Rates: Counts per Hour

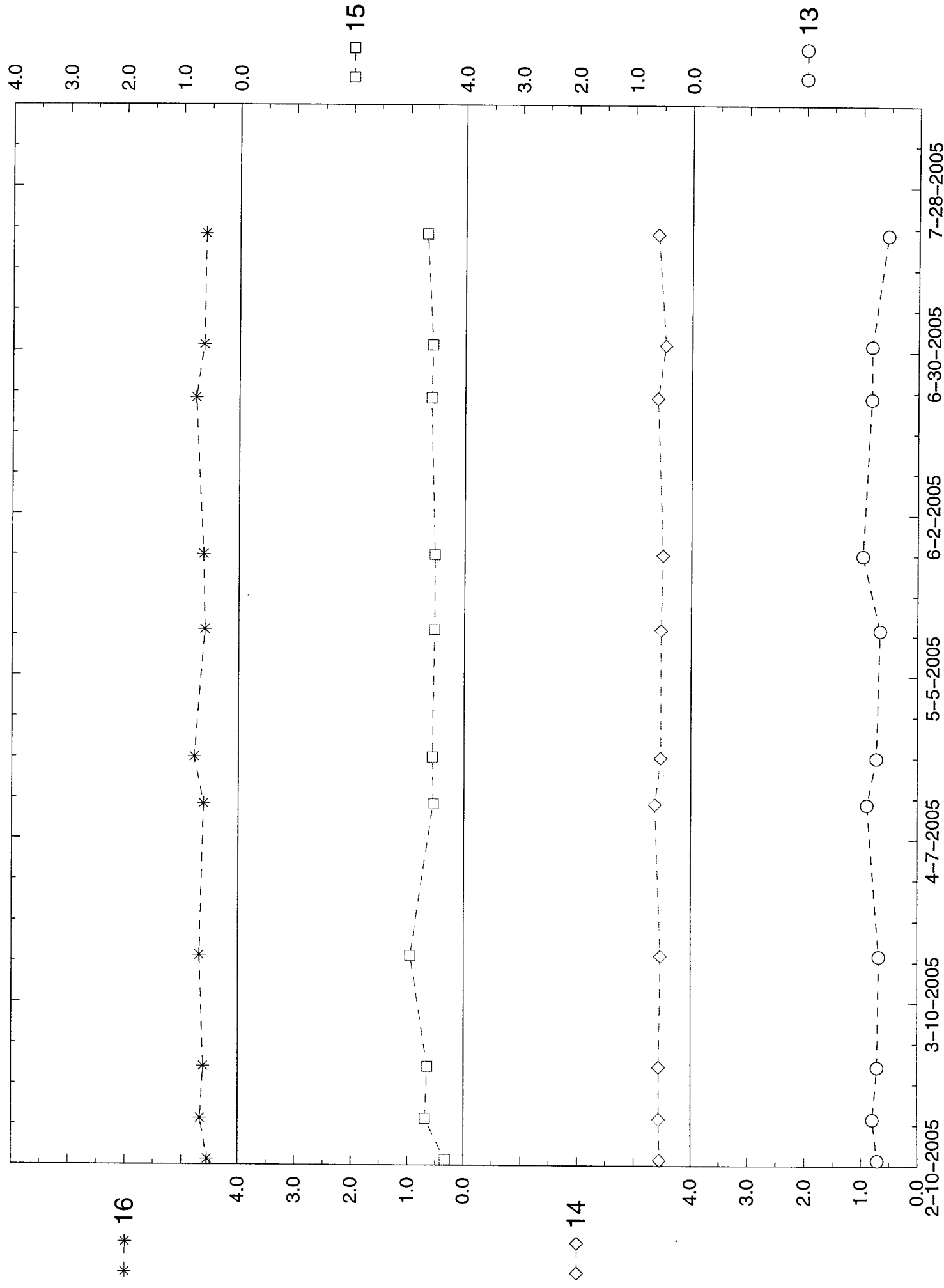


naboo  $\alpha$  Detector Background Rates: Counts per Hour



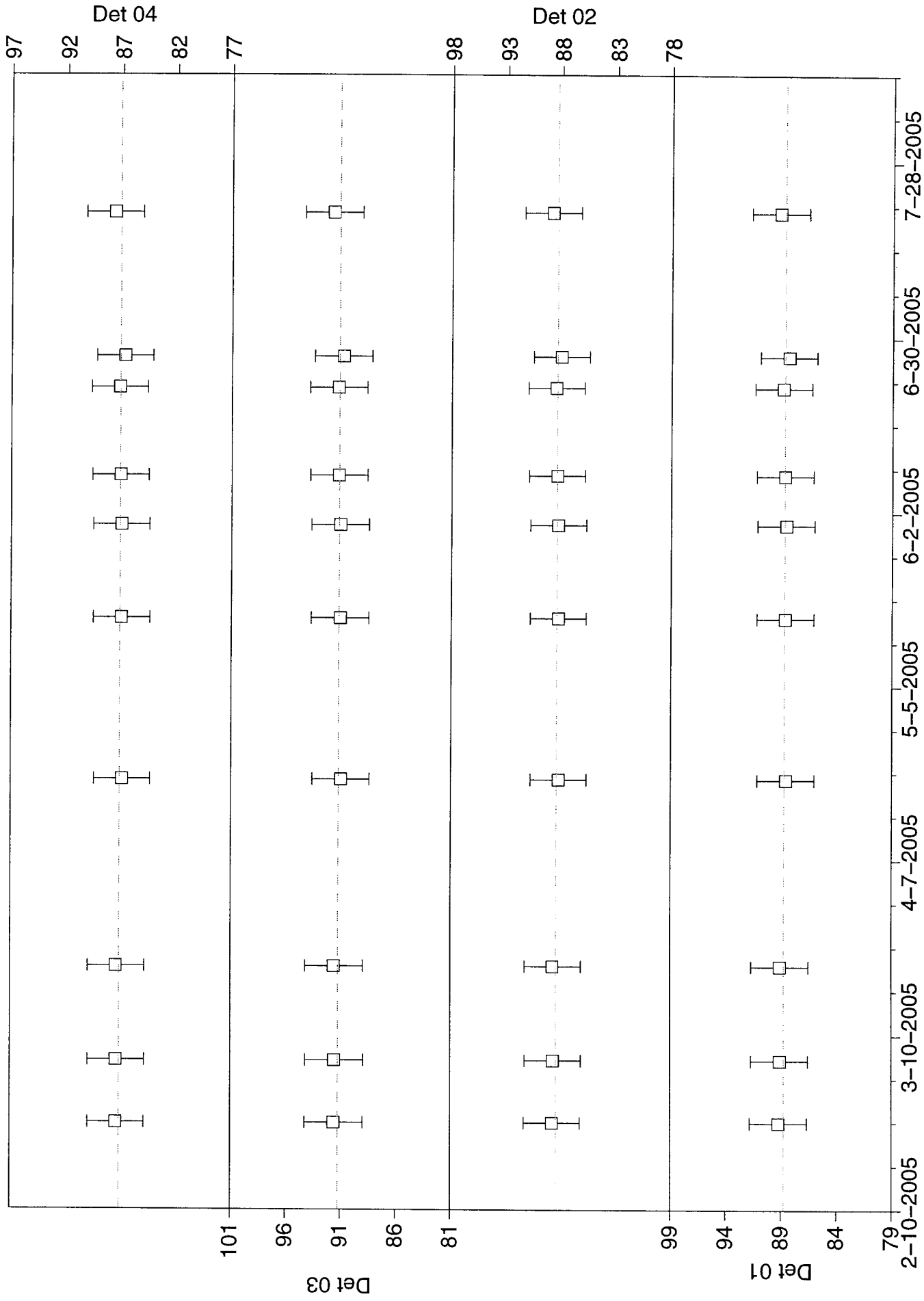


naboo  $\alpha$  Detector Background Rates: Counts per Hour



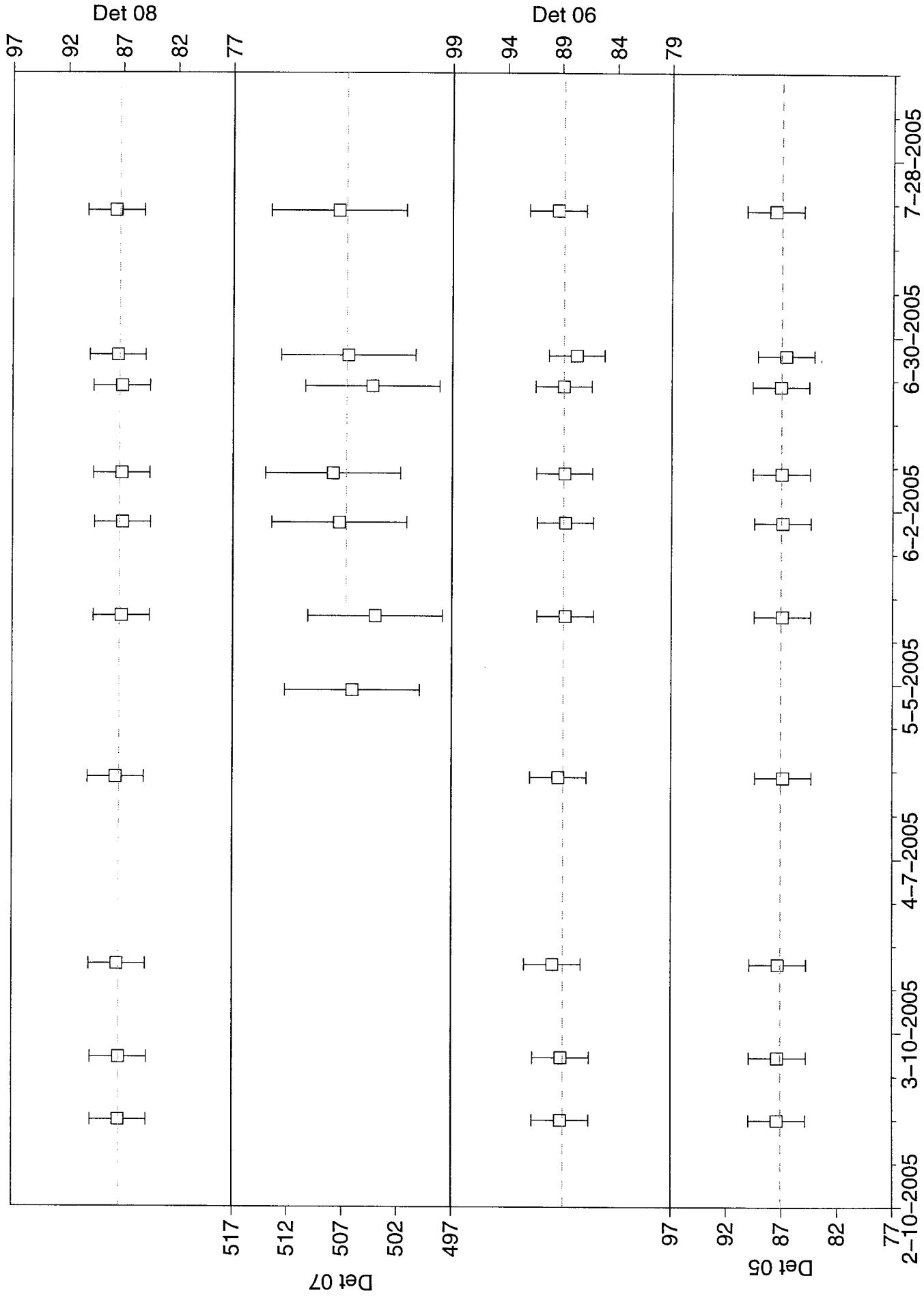
# naboo $\alpha$ QC Pulsar Check

Pulses per Second



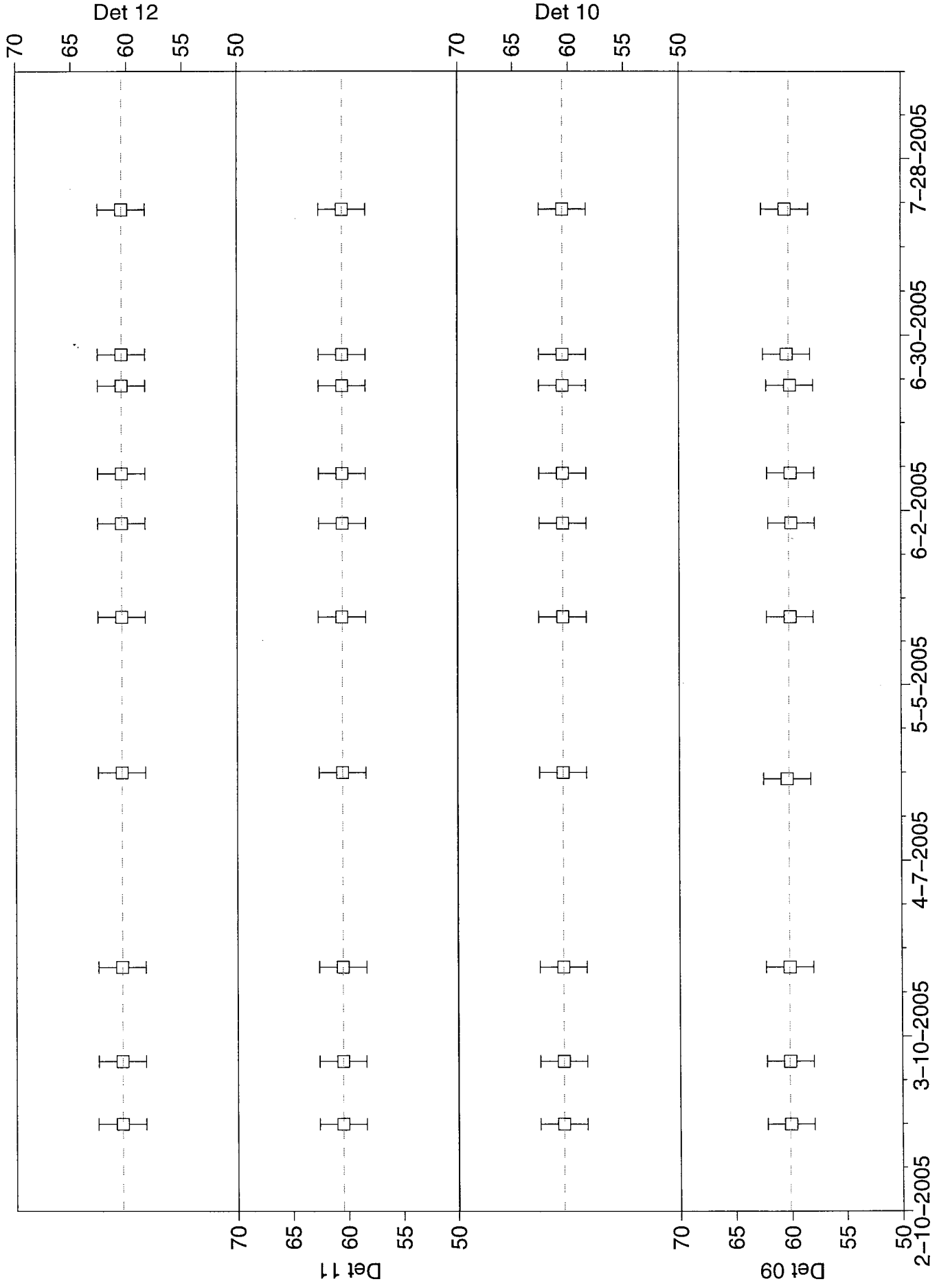
# naboo $\alpha$ QC Pulsar Check

Pulses per Second



# naboo $\alpha$ QC Pulsar Check

Pulses per Second



# naboo $\alpha$ QC Pulsar Check

Pulses per Second

